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ARTICLE I.

COMPARATIVE PHONOLOGY; OR THE PHONETIC SYSTEM OF
THE INDO-EUROPEAN LANGUAGES.¹

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PHONOLOGY is, to modern apprehension generally, a new science. Several centuries, however, before Christ, Sanskrit scholars had thoroughly studied and classified its facts and principles; although, in every other language, it has remained, while possessing a potential presence in it, unappreciated as a science to this day. The ear of the Greek was, beyond that of any other people, vitally susceptible to its charms; but the Greek mind was, in this as in all other relations, too averse from the real God that made heaven

¹ The design of this Article, which is an independent treatise by itself, and the only one upon the subject in our language, is to present, in a succinct view, the leading results of recent investigation into the variations of the same radical forms, in different languages. The works to which special reference has been made, in its preparation, are the following: Bopp's *Comp. Gram.* trans. by Eastwick; Bopp's *Vergleich. Gram. neue Auflage*; Benary's *Lautlehre*; Hofer's *Beiträge*; Rapp's *Vergleich. Grammatik*; Heyse's *System der Sprachwissenschaft*; Diez's *Gram. der Romanischen Sprachen*; Diez's *Lexicon Etymologicon*; *Zeitschrift für Sprachforschung*, especially several Articles in it by Ebel, Benary, Kuhn, Förstemann, and Corssen; Georg Curtius's *Schulgrammatik*; Max Müller's *Survey of Languages*; Sophocles's *Hist. Greek Alphabet*, etc. etc.

and earth, in its position, to contain to any large degree, in itself, any of the attributes or even instincts of true science; so that all its high philosophical architecture, in every field of intellectual labor, was only of the speculative order of composition. But, recently, phonology, a science utterly forgotten among men, looking out, itself, like an all-seeing spirit, from within the folds of every language, but seen of no one while lurking there, has been detected and caught by scientific modern exploration, and led forth again, a willing captive, exultingly to view. By the comparison of words in different languages, on an extended scale one with the other, as well as by the careful study of the various graphic symbols of sound in the ancient tongues, the secret treasures of this long-lost science have been finally disclosed; and modern phonology is found, when reduced to its last analyses, to be exactly the same that Sanskrit grammarians, more than two thousand years ago, defined its elements to be, in their own primeval language.

Two lines of investigation are open to the student of words, in the department of etymology: the one concerning the anatomy of their individual constitution, and the other concerning their pathology, or the influence of time and circumstances upon them; or, which is the same thing, their genetic structure as living organisms, and their subsequent history and experience, as they have been borne from one climate or age to another. As, in the forms of matter, we find an inorganic element as the base, in combination with one organic and vital; so, in the forms of words, the stem, theme, or base is the material element, and pronouns, in the shape of suffixes, whether for verbs or nouns, constitute the formative or organic element of language. A similar distribution exists, to some extent, between consonants and vowels, as the individual components of a word. The consonants form its skeleton; and the vowels, the living fulness of its strength and beauty. They give language all its variety of hue, and all the play of light and shade upon its surface. In the disposition of the consonantal elements of a word, lies the mere drawing of its outlines; while the com-

mingling of the different vowel-sounds constitutes its full pictorial presentation to the ear and eye.

The fundamental constituents of speech are necessarily, in all languages, alike; and not only so, but the same elemental bases also prevail in all the occidental languages of the world, and constitute their common osseous structure. Although therefore these languages, like those who use them, are divisible into different families and races, they are all still of one origin, and possess one similar nature; and yet each has some sounds or classes of sounds that others reject, for euphonic, as we generally say, but really for euphemic or eulogic, reasons; as it is the greater ease of utterance in one case compared with the other, more frequently than the mere greater pleasure had in the hearing of a different sound, which determines the reason of its adoption. The seeming differences, accordingly, of the Indo-European languages, however great, are, the mass of them, only seeming, and not real.

The organs of speech are the lungs, throat, tongue, lips, teeth, nose, and roof of the mouth. These are all greatly affected, in their separate and combined development and action, like the other several parts of the body, by climate, food, occupation, habit, character, and culture. The influence of natural causes, in determining the specific peculiarities of different nations, tribes, and families, in reference to the cranium, the face, the eye, the voice, the chest, the figure, and even the most minute bones and organs of the body, is very decisive, beyond the philosophy or fancy of most even intelligent men, who are not specially conversant with the marvels of this sort, which abound in the natural history of man. One people use more or less easily, and therefore naturally, their lips, tongues, or nose, their teeth, or throat, in speech than others do, from the larger or smaller development of some specific organ or organs, that, from greater relative fulness or feebleness, are thereby specially strengthened, or restrained in their action. A difference also of more or less, in the general structure of the minute parts of the ear, may sometimes perhaps determine wide differences in this re-

spect. It is a familiar fact, that climatic influences occasion wonderful varieties of appetite and taste for food, among men in the several zones of the world, and even, during different seasons, in the same zone. And not only each latitude, but also each local region in the same latitude, under the influence of its specialities of landscape, air, sky, and various surroundings, furnishes its individual types of national stature, strength, complexion, and features; so that every nationality is made to bear inevitably its own seal perpetually upon its brow. And, as thus in the outer, so also in the inner bones, angles, and muscles of the mouth, face, and ear, climatology opens to view, as the result of its wonderworking magic, in each varying portion of the earth, a surprising number of diversified effects of its own upon man, made purposely by his Maker the most impressible of all His works by its influence. As in our compound nature, matter and spirit are mutually interlinked, and made strangely magnetic and retroactive each upon the other; so, with a double tie of reciprocal adaptations, we are placed, body and soul, within the physical universe, to act freely and fully upon it, and in return to receive at all times into every inlet of our being, in ways the most secret and silent, the subtle contact of its manifold influences.

The greater preponderance, accordingly, of vowel-sounds, in languages spoken in mild sunny latitudes, and on the contrary the greater prevalence, as a general fact, of consonants, in those which are spoken in cold or mountainous regions, is not accidental. There are no accidents anywhere in the entire realm of human causation, any more than in that of divine agency. And so likewise the fact is founded on determinate physical causes, that the French like nasal sounds so much, while the Germans entirely reject them and prefer gutturals, which the French dislike; and that the English and Americans have naturally high voices, as also that those, in other climates and of other characteristics, have an utterance of a deep barytone quality. The same primitive radical, as it took on, in different places and ages, the influence of Celtic, Greek or Gothic soil and culture, de-

veloped into quite a different word-growth, of greater or less strength and fulness in its foliage, of more or less brightness and largeness in its flowers, or of greater beauty and sweetness in the fruit hanging upon its boughs.

In phonology more difficulties are to be met, than in any other field of philological investigation ; mistakes are easily made here, and at times indeed seem, on the review of them, to have been almost unavoidable. It requires a much more exact and critical scrutiny of the organs of speech, than one not versed in such matters would suppose, and of their varied functions, as well as of the most subtle affinities and repellencies of sounds themselves, which are often as difficult of complete mastery, as any harmonist like Mozart, Haydn, or Beethoven, could feel them to be in musical relations, when searching for the beauties or wonders of sound. Phonology is not therefore, as one of the inductive sciences, a mere mass of linguistic facts standing majestically, like geology, as a column of beauty by itself. Its complications, on the contrary, are many and wide ; and it rests for its base on a thorough philosophy of the human voice and of all its necessities, capabilities, and conveniences.

As it is the design of this Article to present rather a clear general outline of the subject, than one conformed, in its details, to a minute and exhaustive analysis of its entire contents, it will not be unprofitable to survey, at the outset, in a distinct synopsis by itself, the general outlines of the course of inquiry, which will be traversed.

I. A general statement of the elementary analysis of words, in the three classical languages.

II. Their vowel systems, severally :

1st, Structurally,

- (1) In reference to simple vowels.
- (2) In reference to compound vowels.

2d, Pathologically,

- (1) Counterpoises,
- (2) Compensations.
- (3) Variations in the radical vowel.
- (4) Contracted forms.

(5) Strengthened forms.

(6) Weakened forms.

(7) Euphonic additions.

III. Their consonantal systems, severally :

1st, Structurally,

(1) Simply.

(2) In combination.

2d, Pathologically,

(1) Generally, with a view of the general laws of change in word-forms.

A. Substitutions :

1st, Literal,

(1) Absolute.

(2) Assimilative.

2d, Topical,

(1) Metathesis.

(2) Hyperthesis.

B. Insertions and additions :

1st, Prosthesis.

2d, Epenthesis.

3d, Epithesis.

C. Suppressions :

1st, Aphæresis.

2d, Elision and ecthipsis.

3d, Apocope.

D. Weakened Consonantal forms.

E. Strengthened Consonantal forms.

(2) Specially,

A. The Greek.

1st, Its dialects.

2d, The phonetic force of its different letters, in alphabetic order.

3d, Special pathological affections.

(1) Digammatation.

(2) Sibilation.

(3) Aspiration.

(4) Reduplication.

(5) Nasalization.

B. The Latin.

1st, Benary's classification, in brief, of the fundamental principles of its special phonetic system.

2d, The phonetic force of its letters, in alphabetic order.

I. A general statement of the elementary analysis of words, in the three classical languages : the Sanskrit, Greek, and Latin.

In the language of Benary, "the natural classification of sounds according to their organs, and the distinction of mutes and liquids, and of vowels and consonants, was recognized by the Greeks and adopted by the Romans, without any high standard of criticism or any conscious demand for them in their language. But the finer differences in their use, the relationship of the vowel with the consonant, the mutual attractions and affinities of sounds one to the other, or their mutual repellencies ; the influence of the mechanical weight of the syllable, upon the vowel and the consonant contained in it ; all these are questions which have been first thrown upon our own age, and for whose solution it is toiling." With the qualification already indicated, that this exposition of the new work of our age has no reference to the progress of early Sanskrit scholarship in the same direction, it is true ; true of all languages in all ages, but that one noble representative of the whole Indo-European family, whose remains were locked up so carefully in India, until the time when the world was ready to appreciate and employ them, for the illumination of all the other languages of mankind..

A comparison of the classical languages, one with the other, in respect to their different phonetic elements, is interesting. This Förstemann, who may well be denominated the philological statistician of the age, has carefully made, and announced the result as follows : among one hundred sounds, reckoning diphthongs and double consonants as simple sounds, the relation of vowels to consonants in Sanskrit, Greek (the Attic dialect), Latin, and Gothic, is expressed in the subjoined table.

	SANSKRIT.	GREEK.	LATIN.	GOTHIC.
Vowels,	42	46	44	41
Consonants,	58	54	56	59

Thus, in the three classical languages and the Gothic also, the vowel element falls much behind the consonantal: in the Sanskrit and Gothic most; and in the Greek, least. In the Greek, the vowels compare with the consonants, in number, as 6 to 7; in the Latin, as 4 to 5; in the Sanskrit, as 7 to 9; and in the Gothic, only as 7 to 10. In reference to their proportional mixture of these two elements, the Greek and Latin on the one hand, and the Sanskrit and Gothic on the other, compare most nearly with each other; while the Latin and Gothic agree less, and the Greek and Gothic least. In all the four languages, the liquids are far more abundant than the mutes. In respect to the whole mass of consonants, the Greek prefers the mutes most, and the Gothic least; while, vice versâ, the Gothic adopts liquids most, and the Greek least; the Latin occupies medial ground between them, while the Sanskrit uses liquids more than the Greek or Latin, but less than the Gothic. Linguals (d, t, l, n, r, s) are more abundant, in all four languages, than either gutturals (c, k, g, q) or labials (b, f, p, m), or both combined. As to the distinction of smooth, middle, and rough mutes, the smooth are most abundant in Greek, and nearly quite as numerous in Latin; while in Gothic they occur only one-sixth as often as in Greek. The Latin shows a decided dislike for aspirates, while the Greek and Gothic exhibit as striking an inclination towards them. The most frequent liquids, and indeed the most frequent consonants (excepting t in Latin), in the Latin, Greek, and Gothic, are n and s, and after these, m and r; and, last of all, l; which letter also occupies, in Sanskrit, a less conspicuous place than in the European languages. The greatest disproportionate use of any consonant in the Greek and Latin, occurs in the letter m, which in Latin is used three times as often as in Greek. In Latin also, r is more abundant than in Greek, while in the latter s occurs more frequently than in the for-

mer. Sibilants indeed were favorite with the Greeks, most of all; while in Sanskrit they occurred least of all: the Latin and the Gothic occupying medial ground in respect to them.

As to the vowels, the most equal distribution of them occurs in Latin. The vowel *i* is, in this language, most abundant; in Greek, the *e* and *o* sounds take the lead of the other three; while in the Gothic, *a* forms more than a third part of the whole mass of vowel sounds, diphthongs included. In the Latin, diphthongs occur but one-sixth as often as in Greek, and only one-tenth as often as in the Gothic; so that the Latin and the Sanskrit occupy the negative pole of diphthongal development, and the Greek and Gothic the positive.

The vowel differences, therefore, of these great primal languages are wider than the consonantal. The Greek and Latin agree most with each other in their abundant use of vowels: the Latin and Gothic next; and the Greek and Gothic least. In the following table, the vowel correspondences of these different languages are presented in detail.

VOWEL.	GREEK.	LATIN.	GOTHIC.
a,	17	16	35
e,	ϵ 19 } 32	24	4
	η 13 }		
i,	7	27	18
o,	o 13 } 19	14	4
	ω 6 }		
u,	6	16	9
ai,	6	0	12
ei,	4	0	6
oi,	2	0	0
au,	1	1	11
eu,	1	0	0
ou,	5	0	0
ae,	0	2	0
iu,	0	0	0

Calling *ā*, *i*, *u*, the older vowels, and *e*, *o*, the more recent, we find :

of	GREEK.	LATIN.	GOTHIC.
The older,	30	59	62
More recent,	51	38	8

Here is a sure testimony to the great unchanged antiquity of the Gothic vowel system, and to the striking degeneracy, also, of that of the Greek, from its primeval state. Calling *i* and *e* bright vowels, as philologists sometimes do, and the vowels *o* and *u* opaque, then we have the following comparison, as to the pictorial elements of syllables, or the relative amount of their light and shade.

	GREEK.	LATIN.	GOTHIC.
Bright,	39	51	22
Dark,	25	30	13

So that, in all these languages, the bright vowels occupy nearly twice the space of the others.

While such a mere statistical analysis¹ does not interest the writer, as would one that was philosophical and inward rather than outward in its scope, it is still of sufficient value, in itself, to deserve the limited space which it occupies in this Article; and there are many minds, in every department of labor, that greatly relish statements in figures. Figures, they say, cannot lie; which, if true in one sense, is not in all; since no form of demonstration is more apt to lie in blank forgetfulness, than arithmetical tables; which are usually thought to stand so well, in their place, in books, marshalled in solemn rank and file, that they are seldom if ever transferred to their admirer's mind, as the living companions of his thoughts.

Förstemann's inductive analysis covers the ground which Heyse² denominates the specific substance of sounds. He

¹ *Zeitschrift der vergleich. Sprachforschung*, Vol. I. pp. 163—179, and Vol. II. pp. 36—44.

² Heyse's *System der Sprachwissenschaft*, p. 262.

divides the elements of speech into two general kinds : those substantial, and those accidental ; each of which he separates also into two subordinate classes ; embracing in the substantial, the specific substance of each word, on the one hand, and its specific weight, on the other ; and in the accidental, the two elements of quantity and accent.

II. The vowel systems of the three classical languages, viewed separately.

1st, Structurally :

(1) In reference to simple vowels.

A vowel (vocalis) is a mere utterance of voice, an audible expulsion of air through the throat, when in a more or less open or compressed state. The vowel, emitted with the greatest ease from the throat, in its most natural open condition, is a, pronounced ah. This vowel was originally ever present in Sanskrit words, and therefore, without doubt, in the primeval parent-Arian tongue itself ; being a sort of universal solvent for every consonantal sound. Every consonant, with whatever sound it began, ended, in the earliest era of the Sanskrit, in that vowel ; so that, while it was rich in letters, it was yet poor in sounds. Thus b, p, k, t, were each uttered by themselves, as bah, pah, kah, tah, and so on throughout the whole range of mutes. Such a system of vocalization, admitting no play of light and shade among the elements of speech, tended of course to utter phonetic monotony. And yet it must not be supposed that all original syllabication ended uniformly in a vowel ; as ultimate verb-roots are found, ending in al, an, ar, as well as in da, sta, etc.

The three vowels a, i, u, form the diatonic scale of vowel sounds, and are therefore sometimes called the original or primary vowels. These are the only simple vowels found in Sanskrit and Gothic ; the others (e and o) are but modifications of them in any language, and are therefore called, relatively to them, the secondary vowels. Each vowel has its own separate scope and power ; and, when heard in a succession of syllables, or found greatly prevailing in syllabic combinations, its effect is very specific and distinct ; as

much so as that of different keys, in the style and quality of their musical expression.

The vowel that has what philologists call the greatest mechanical weight or effect is a; that is, this vowel has a greater amount of vowel substance in it; and so acts as a makeweight, in a combination of sounds otherwise light, or gives them a gravity of utterance beyond any other vowel. The lightest of the vowels is i, while u occupies a medial place; e and o, although commonly regarded as simple sounds, are formed from a, by its combination with i and u, and are really, therefore, diphthongs. Short a, in Sanskrit, united with i, becomes ê; which corresponds exactly with the phonetic value of ai in French, pronounced as if ê, as in j'ai and jamais. Compare also the absorption of *i* subscript in Greek, in the dative forms of the 1st or A-declension, and also its short pronunciation, or its estimation as short for purposes of accentuation, in the plural nominative form *ai* of the same declension. In a similar manner the Greek *ai* becomes, in Latin, *ae*, except in a few proper names, as Aglaia, Maia, etc. A long a formed in Sanskrit, with i, the diphthong ai; as in English, in the word aisle. In combination with u, a forms likewise, in Sanskrit, o, as a diphthong; a result corresponding, precisely, with the same fact in French, where au is pronounced o, as in aune and autre.

Heyse, in order to represent the different degrees of fullness of sound possessed by different vowels, ascribes to the sum of both the openings of the mouth in the utterance of a, eight degrees, and to u (pronounced as oo) six, and to i four degrees. The two openings alluded to, are that made by the lips, and that made between the tongue, according to its different positions, in the utterance of the different vowels, and the roof of the mouth. The secondary vowels e and o, have also the same sum of degrees (6), in the two openings of the mouth as u, and yet are lighter; inasmuch as, in the utterance of o, and especially of e, the roof-space of the mouth is much narrower than in the utterance of u. In this space, as in an open chamber, the voice is

immediately received from the throat and resounds from the arch above, as from a sounding-board, just as it came from the larynx, or is modified by the tongue, in this part of its passage to the lips. The different widths of openings in the roof-space are five in u, four in o, and two in e; so that o is lighter than u, and e much lighter than o. So also, as the differences of breadth, in the sum of the mouth-openings, between a and u are made by the lips; which chiefly serve to give utterance to sounds, as they are in themselves for substance, rather than to determine their volume or force for them: u is much less light than a, in its individual weight, less indeed than the difference of degrees would indicate; inasmuch as the roof-space is greater in u than in a, in the proportion of five to three. The vowels are to be ranked accordingly, in reference to their weight from heaviest to lightest, in the following order: a, u, o, e, i.

The vowel a is the stable or fixed element, in the diphthongs e (a+i) and o (a+u); and the vowels i and u are movable or floating elements; by the combination of which two kinds of elements, all diphthongs are formed. In Sanskrit the vowel a represents properly, in a final analysis, the stable element of all diphthongs; and from this element the diphthong obtains its true quantitative value. When, in any language, either of the incidental elements i or u occur first in the diphthong, and are followed by the stable element a, or by one of the floating vowels i or u themselves, then the last vowel determines the quantitative value of the compound, and the first one falls back into its corresponding consonantal equivalent; so that i and a become ya, and u with a makes va.

Ebel calls a, on account of its greater weight in a syllable, in all the classical languages, the masculine vowel, and the vowels e and i, on account of their lightness, the feminine vowels. Philologists of the modern school divide them, also, not only into long and short, as others have done, but likewise into hard and soft: calling a, e, and o (α , ϵ , η , ω) hard, and the vowels i and u soft; and likewise

into dark or opaque, middle, and clear; calling o the opaque, a the middle, and e the clear or bright vowel.

The vowel-system of the Sanskrit is the most antique in its style, next to which stands the Gothic, followed immediately by the Latin; while the Greek has degenerated most of all, from the primitive Indo-European vowel-system.

Both philology and history agree in representing a to be the great fundamental primordial vowel, of which the others are but successive weakenings. A striking example of the change of an original a into each of the weaker vowel-sounds, in the other classical languages, occurs in the Sanskrit ordinal saptamas, the seventh; represented in Greek by *ἑβδομος*, and in Latin by *septimus*; where the same vowel a appears variously, as *ε*, and *ο*, and also as *e*, *i*, and *u*. Similar variations also appear in the Sanskrit *madhya* (s) middle, Gr. *μέσος*, and Latin *medius*; and also in *ποδός*, *πόδες*, and *πόδας*, all different cases of *πούς*, and each having one and the same correlative form, *padas*, in Sanskrit. Behold, also, the following examples of the diversified representation of the Sanskrit a, by various vowels in the other languages:

	SANSKRIT.	GREEK.	LATIN.
<i>ε</i> .	<i>api</i> , towards. ad, to eat.	<i>ἐπί</i> <i>ἐσθίω</i>	ob. edo.
<i>η</i> .	{ <i>mâtri</i> , a mother. <i>mâs</i> , the moon. <i>mâsa</i> , a month. }	<i>μήτηρ</i> <i>μήν</i> <i>μήνη</i>	mater. mensis.
<i>ι</i> .	{ <i>açvas</i> , a horse. <i>kas</i> , who. }	<i>ἵππος</i> <i>τίς</i> (for <i>κίς</i>)	equus. quis.
<i>ο</i> .	{ <i>apa</i> , from. <i>naman</i> , a name. <i>svasar</i> , a sister. <i>upa</i> , under. }	<i>ἀπό</i> <i>ὄνομα</i> <hr/> <i>ὑπό</i>	ab. nomen. soror (for <i>sosor</i>). sub.
<i>υ</i> .	{ <i>kalasa</i> , a cup. <i>nakhas</i> , a nail. <i>sam</i> , with. }	<i>κύλιξ</i> <i>ὄνυξ</i> <i>σύν</i>	calix. cum.
<i>ω</i> .	<i>çvan</i> , a dog.	<i>κύων</i>	canis.
<i>ει</i> .	<i>tan</i> to extend.	<i>τείνω</i> (for <i>τένω</i>)	tendo.

In Latin, *i* being lighter than *a*, generally supplants it, when a root with an original *a* would be too much burdened by a reduplication of the radical syllable, as in *tetigi* for *tetagi*, and this, without any change, for *tatagi*. So, also, radical *a* and *e* both encounter alteration at once in this language, when the root is laden with prefixes of whatever sort, as may be seen in instances without number, in verbs compounded with prepositions.

As Ebel well says: "one of the most difficult questions concerns the relation of short *e* and *i* in Latin. Does *e* pass into *i*, or *i* into *e*; and under what conditions does a become *e* or *i*?" These questions he has investigated with care, and arrived at the four following results, of a general kind: 1. *a* passes regularly, in the beginning and middle of words, into *i*, before single consonants, except *r*, *h*, *v* (preceding which *a* everywhere remains unchanged), and before the nasal *ng*. For examples, see *adjicio*, *confiteor*, *immineo*, *tubicen*, *flammifer*, and *transigo*. It passes, regularly into *e* before *r* and *r*-combinations and double consonants, particularly *ss*, *st*, *ps*, *x*, *nt*, *nd*, double mutes, double liquids, and mutes with liquids, as in such examples as *adjectus*, *condemno*, *confessus*, *imberbis*, *inermis*, *iners*, and *infectus*. The declaration here made is, however, but a little more minute statement of the general rule given by Bopp, that "an original *a*, when loaded with additional elements by composition or reduplication, is in most roots exchanged for *i* in open syllables; but before two consonants, and, in end-syllables before one, it is generally weakened into *e*." 2. When the root-vowel becomes variously *e* and *i*, in different cases, as in *princeps* *gen. principis*, the analysis of the fact is, that they are, each, successive weakenings of an original *a*-vowel in the root. The retention of *e* before double consonants instead of *i*, in verbs, where in the first root *i* had been used before a single vowel, shows the felt necessity of guarding the radical vowel against being overborne in its force by the consonants accompanying it: *e* remains, also, in many roots where one would expect *i* before single consonants, as in the compounds of *metior*, *meto*, *pe-*

to, seco, sequor, tego, and some of the flexion-forms of nouns in es.

3. The relation of the two vowels appears very clearly in end-syllables, before single consonants, namely s and n.

I takes the place of a before s: in the genitive of the third declension; in the 2d sing. present of the third conjugation, as in legis for legasi; and in all 2d singulars passive and 2d plurals active. In such forms as deses (verb-root sed), superstes (verb-root sta), -ses is for seds and -stes for stets, in which e is still retained, although by abbreviation the d and t are lost. In such words as vomis compared with vomer, and so cinis, pulvis, cucumis (gen. cucumeris), with stems all ending in -er, we have undoubted instances of the convertibility of s and r final, as in arbor and arbos, honor and honos, together with the subsequent shortening of the e into i, according to the usual rule; so that as genus (gen. generis) is for genes (like γένος for γένης, its stem), cinis is for cines and this for ciner, the proper base of the word. In such words as sanguis (gen. sanguinis, stem sanguin), s is the gender sign and n is dropped before it for euphonic reasons.

4. In some circumstances e seems to be formed from an original i, as in judex (jus+dicō). In comes (cum+eo), as in eo itself (stem i), and eum accusative of is (demonstrative stem i), we have gunalized forms of the original stems.¹

Kuhn's analysis, also, of a few facts of the Latin vowel-system is worthy of notice here. "The history of the Latin vowel-system," he says, "presents, as is well known, a considerable number of difficulties, whose solution can be obtained only in a strict methodical way. As the Sanskrit has kept generally the older and fuller endings of words; by a comparison of a, in the end of Sanskrit words, with the endings of similar forms of the Latin, some principles can be obtained which will serve to elucidate the Latin vowels.

The Sanskrit a has, in the end-syllables both of declen-

¹ Zeitschrift der Vergleich. Sprachforschung, Vol. V. p. 181.

sion and conjugation, a much wider scope than in Latin ; whose endings have been partly rejected and contracted, and partly, as those of the passive, supplanted by others. The following facts are arrived at by examination :

1. Sanskrit a final sometimes becomes e in Latin : as in the vocative in e (Cf. Latin *lupe* with Sansk. *vrika*) ; in the 2d pers. sing. and pl. imperative (Cf. Lat. *tunde* and *tundite* with Sansk. *tuda* and *tudata*) ; and also in some particles and indeclinable words (Cf. Latin *que* and *ne* and *quinque* with Sansk. *ca*, *na*, and *pañca*).

2. Sanskrit a final is sometimes rejected in Latin ; as in the dative of the 2d or O-declension, which has lost a previous i, representative of a Sanskrit a ; which that it actually once had in old Latin, is apparent from the Oscan dative *ui* and the Umbrian *ê* and *î*.

In the exceptional imperative forms *dic*, *duc*, *fac*, and *fer*, the same tendency to an abrasion of e appears on a small scale, as also in the conjunctions *ac* and *nec* for *atque* and *neque*. So the conjunction *at* is for Sansk. *atha* ; as *nam* is also for *nâma* ; the original a, or its representative e in Latin being rejected in these and other instances after c or a liquid.

3. Sometimes Sansk. a becomes long *â* ; as in *utî*, Sansk. *uta*. In a few instances a final is found in Latin, where it does not occur at all in Sanskrit ; or, if it ever did, it has fallen off,¹ as in the cardinals *triginta*, *quadraginta* (*τριάνκοντα* and *τεσσαράκοντα*), compared with the Sansk. *trinçat* and *catvarinçat*.²

In Latin, as in Greek, e is the prevailing representative of an original a ; while o is also often, but less commonly so than in Greek. The following are a few of the numerous examples in o : Sansk. *avis*, a sheep ; *mar* and *mri*, to die ; *ashtau*, eight ; *svan*, to sound ; Latin, *ovis*, *moriôr*, *oc-to*, *sono*. The long Sanskrit *â* is most generally repre-

¹ That it has actually dropped off in the Sanskrit appears, almost if not quite absolutely certain, from the Zend forms, in which it occurs, *thrisata* and *chatvar-sata*.

² *Zeitschrift der Vergleich. Sprachforschung*, Vol. VI. p. 436.

sented by *ō*, as in *sōpio*, Sansk. *svâpâyâmi*. The Latin *e* is of double origin, being either like the Greek *η* and Gothic *ê*, a weakening of long *â*, as in *sēmi*, half, Gr. *ἡμι*, Sansk. *sâmi*, and *rēs*, a thing, Sansk. *râs*. So the Sansk. *dēvaras* (for *daivaras*) is represented by *lēvir* (for *laivirus* for *daivirus*), Gr. *δαίερ* for *δαΐερ*.

That *i* is not only lighter in Latin than *a*, but also than *u*, appears by its adoption in compound forms, where, for the sake of a compensative lightening of the vowel-weight of the root, a radical *u* final is changed to *i*; alike in the middle of the compound, as in *corniger* (*cornu*) and *fructifer* (*fructum*), and also in a final syllable, as in *imberbis* for *imberbus*; in which last word, as the proper adjective-form for an *a*-word, as *barba* is that in *-us*, *-a*, *-um*, the *u* is changed to *i*, on the principle that *i* has less weight than *u*, in an end-syllable. In Latin, the soft Greek *υ*, which was the same as the French *u* and the German *ue*, is entirely wanting. An original *u* in Latin was indeed sometimes changed to *i*, as in *libet* from *lubet*, Sansk. *lubh*, and *optimus* from *optumus*; while in other cases it seems to have wavered to and fro, at different times, towards *o* and back again to *u*, as in *vult*, *volt*, *vult*, and *vulnus*, *volnus*, *vulnus*.

In Greek, as elsewhere, *a* is the heaviest of the vowels, acting most strongly as a counterpoise when added to forms otherwise light; while *e* is the lightest of the vowels, being used in forms otherwise heavy; and *o* is employed in those forms which are of intermediate weight. In *τέμνω* (stem *ταμ*), 2d Aor. *ἔταμον* and the derived noun *τόμος*, and so also in *στέλλω* (stem *σταλ*), perf. *ἔσταλκα* and *στόλος*, the balancing influence as counterpoises of these different vowels, and so their different phonetic force in themselves, may be clearly seen. The Greek vowels, accordingly, are *a*, *e*, *i*, *o* long and short, and short *u*, which was long only in the diphthong form *ou*.

The short *ε* and *ο* sounds of the Greek were wanting in Sanskrit, as also in the Gothic, the oldest Germanic dialect. The short Sanskrit *ä* is oftener represented by *ε* or *ο* in Greek, than by short *a*; while the long Sanskrit *â* is more

frequently represented by η or ω than by long alpha, as in $\tau\acute{\iota}\theta\eta\mu\iota$,¹ Sansk. *dadâmi*, I place, and the dual suffix $-την$, Sansk. *tâm*. In the Doric dialect, however, we find long a abundantly where, in the Attic dialect, we have η , as in Dor. $\acute{\alpha}\mu\acute{\epsilon}\rho\alpha$, Attic $\acute{\eta}\mu\acute{\epsilon}\rho\alpha$, day, and $\tau\iota\mu\acute{\alpha}$, honor, for $\tau\iota\mu\acute{\eta}$. Indeed, long a was a special peculiarity of the Doric dialect, and caused that broad pronunciation, for which the Dorians were so noted.

The Sanskrit diphthong \hat{e} (a+i) appears in the Greek variously, as $\epsilon\iota$, $\omicron\iota$, $\alpha\iota$, as in $\epsilon\acute{\iota}\mu\iota$, I go, Sansk. *êmi*; $\omicron\acute{\iota}\delta\alpha$, I know, Sansk. *vêda*, Dat. $\mu\omicron\acute{\iota}$, Sansk. *mê*; while the Sansk. \hat{o} (a+u) appears as $\omicron\upsilon$, as in $\beta\omicron\upsilon\varsigma$, Sansk. *gô*, gen. *gavas*, a cow.

The vowel u retains the most obstinately of all, in Sanskrit, its form and place; and in reduplicated syllables, although a itself is weakened to i, the vowel u maintains its position unchanged, as in *yuyuts* the desiderative form of *yudh*, to struggle, and *tutôpa* (for *tutaupa*, perf. of *tup*, to strike, Gr. $\tau\acute{\upsilon}\pi\tau\omega$, perf. $\acute{\tau}\epsilon\tau\upsilon\phi\alpha$). In Latin, as in *tutudi*, perf. of *tundo*, and *pupugi*, perf. of *pungo*, and also in the Gothic, u shows much more of the same pertinacity of existence that it has in the Sanskrit, than it does at any time in the Greek.

In the Doric and Attic dialects, α is the most and υ the least abundant; while in the Ionic ϵ abounds most, occurring with great frequency in uncontracted forms, as in $\epsilon\alpha$, $\epsilon\epsilon$, $\epsilon\eta$, $\epsilon\omicron$, $\epsilon\omega$, $\epsilon\acute{\iota}$. The vowel ι occurs most in the Doric, next in the Ionic, and least of all in the Attic, being so often subscript.

In reduplicated syllables, a in Sanskrit often appears as ι in Greek, as in $\tau\acute{\iota}\theta\eta\mu\iota$ (stem $\theta\epsilon$), Sansk. *dadâmi*, I place, and $\delta\acute{\iota}\delta\omega\mu\iota$ (stem $\delta\omicron$), Sansk. *dadâmi*, I give. The Greek, however, shows generally far less sensitiveness to the question of the greater or less vowel-weight of the root under new additions, than the Sanskrit, Latin, or even German.

But the vowel-systems of the classical languages must be considered structurally, also,

¹ Cf. in same way $\tau\acute{\iota}\theta\eta\mu\iota$, Sansk. *tishthâmi*, I stand, and $\delta\acute{\iota}\delta\omega\mu\iota$, Sansk. *dadâmi*, I give.

(2) In reference to vowel combinations.

These are of two sorts: vowel-unions of the same kind, and compound vowels of any kind; or, long vowels and diphthongs. Consonants are indeed the staple elements of speech, and vowels are subordinate, both in theory and in fact, to them; having their chief function in affording them a truer utterance, or in enabling them better to follow each other, in successive syllables, or to combine together in the same syllable. Not only, therefore, are original stems all short, being monosyllabic, but also the original radical vowels of those stems. In the progressive stages, however, of lingual development, vowels have been variously strengthened and lengthened; sometimes for mere phonetic reasons, as, to restore the disturbed equipoise of a derivative or composite word, or, which is the same thing in effect, to preserve the stem-syllable from being overborne to the ear, by prefixes or suffixes connected with it; and sometimes also for etymological reasons, to represent to the eye the fact, that abridgments and abrasions have occurred; as well as sometimes for dynamical effect, so as to individualize and emphasize some grammatical characteristic of a word. Short radical vowels have been, for such purposes, accordingly, strengthened, in great numbers in all languages; which can happen in a direct manner only, of course, by adding to them a new vowel-element. If the vowel added be of the same kind, the resultant is a long vowel; but if of another kind, then it is a diphthong; and such a long vowel is, in its true analysis, but the short one doubled in the time of utterance, being twice repeated in the same breath. In the German, such vowel-geminations abound, as in *haar*, *maass*, etc. In ancient Latin inscriptions and records, also, similar instances appear, as in *paacem* (*pacem*) and *moos* (*mos*). In the Greek ω , this fact is directly symbolized to the eye, as a combination of two short omicrons. If two vowels of the same kind do not, when repeated, melt together into one long one, they are changed, by the conversion of one of them to a lighter vowel (as of *ee* into *ei*, and of *oo* into *ou*) into a diphthong.

A diphthong is phonetically the union of two vowel sounds,

a hard and a soft, in one. The hard vowels, it has been said, are a, e, o (Gr. α, ε, η, ο, ω) ; and the weak ones, i and u. When the hard vowels are long in Greek, as ā, η, and ω, the ι united with them is thrown underneath, and thus preserved to the eye, while lost to the ear. In Greek, υ and ι are also sometimes combined into a diphthong, as in υίος.

The synthetic result of a diphthongal union is presented in the symbol used, but not always its analytical constitution : as in the vowels e and o ; which, although appearing to be simple, like the other vowels, are yet compound, as has been stated, in their structure. The Sanskrit affords, in respect to the constituent elements of vowel-combinations, a more precise analysis graphically, in correspondence with their scope and power phonetically, than any other language. As a was in the primary state of the Sanskrit, and therefore, without doubt, of the original mother-tongue itself of the whole Indo-European family, the one only vowel utterance employed ; out of which flowered forth, as a matter of historical manifestation, all the rest in due time, each in a separate way, by itself. I and u are, accordingly, but successive weakenings of the primal vowel a. And while e (a+i) and o (a+u) were, in the earliest stages of phonetic development, but diphthongs, they came by frequent use to be regarded, like a itself, as simple sounds having an independent existence of their own.

In Greek, other special vowel-combinations occurred, as a+e and e+a = η or ε̄ ; and also a+o and o+a = ω. Diphthongs, like ηυ and ωυ, were of a strictly dialectic origin, and differed graphically rather than phonetically from ευ and ου. But in no other language have the vowel elements of the various diphthongal combinations, whether latent or manifest, kept their identity in such algebraic distinctness as in the Sanskrit ; where they seem to move on each other, like particles of molten silver. On this very account they were more impressible to new modifications and new combinations, than in any language besides.

In Homeric Greek we see, also, the vowel-elements, at first distinct that afterwards mingled into one apparently simple

sound, which yet was, in fact both historically and phonetically composite, preserved to us still in clear outline; each vowel maintaining its own individual place and sound, as in the syllabic form of the temporal augment, as well as uncontracted forms generally of both verbs and nouns.

The weak vowels *ι* and *υ* remain before the firm ones *α*, *ε*, and *ο* unchanged, as in *σοφία* and *λύω*; while the firm make, with either of the weak ones, a diphthong.

There is a class of vowel-juxtapositions in Greek, not of the kind above described, which demands here special consideration: those once containing the digamma between them, by whose subsequent omission the vowels have thus fallen casually together; as in *ὄον* for *ὀFόν*, Lat. ovum; *ὄϊς* for *ὀFις*, Lat. ovis; *αἰών* for *αιFών*, Lat. ævum; *βόος* gen. of *βοῦς* for *βοFος*, Lat. bovis; *νέος*, Lat. novus, Sansk. navas. To a practised eye, the very proximity of these vowels to each other carries with it, at once, the evidence of a departed digamma; for vowels connected with each other have not commonly power in themselves, to maintain their own separate existence. In many cases indeed, after the rejection of the digamma, the two concurring vowels were blended into a diphthong, as in *ναῦς* for *ναός* for *ναFος*, Lat. navis; and *πλοῦς* for *πλόος* for *πλόFος*. That such words have any of them remained uncontracted, is owing to the peculiarity of their origin; for, although greatly averse from an hiatus, whether original or derived, the Greeks were still more disinclined to obliterate the original etymological features of their cherished mother-tongue. They had an acute and subtle sense of the true demands of art, in the elaboration of language, which was possessed by no other people.

The three classical languages compare, in respect to their diphthongs, as follows: the Sanskrit and Latin are alike poor in them, which is another of their many points of resemblance; while the Greek is very rich in them, as is also indeed the Gothic.

There are properly but six normal diphthongs, in any language: *ai*, *au*, *ei*, *eu*, *oi*, and *ou*. The other vowel-combinations, found in some languages, as *ea*, *eo*, *ua*, *ue*, *uo*,

ui, ia, ie, io, iu, are all, if regarded as diphthongs, those of an entirely abnormal type. In the enunciation of a diphthong, either of the combining elements may have the most determinative force; but commonly it is the first, except in the diphthongs *ei* and *oi*, where manifestly *i* has the preponderance.

In the Sanskrit, there are two kinds of diphthongs; in the first of which short *a* melts, with *i* or *î* succeeding it, into *ê*; or, with *u* or *û*, into *ô*. In the combination of vowels made by this class of diphthongs, neither of the constituent elements appears in the result; but, as in the chemical union of two substances, they both blend in a third sound, distinct from each of them. In the second class, long *â* forms, with a following *i* or *î*, the diphthong *âi*; and with *u* or *û*, the diphthong *âu*. In these diphthongs, each of the uniting vowels preserves, not only its own form, but also its own distinct utterance; and especially is this true of the *â*. As a diphthong can never occur in Sanskrit except before a consonant, two can never be found side by side; and no hiatus is possible, in any case, from other vowel or diphthongal admixtures.

The first class of diphthongs, formed of short *a* with *i* or *u* both long and short, is made by *guna* (virtue); and the second, consisting of long *a* in combination with *i* or *u* both long and short, is made by *vridhhi* (increase). These are two remarkable affections of Sanskrit vowels, that need to be understood, in order to appreciate the influence exerted by them, in determining many derived forms in other languages. To Bopp, that great natural genius in philology — bearing, like Grimm in all his high successes, as manifestly as Luther, Bacon, Newton, or Washington, the proof of his special ordination for the work that was, in itself, so needful and which he has done so well — we are indebted for an analysis of the nature, power, and scope of these affections, which previous Sanskrit grammarians had stated as facts, but had never disclosed in their true light, as inward forces at work within the machinery of language. *Guna* consists in prefixing short *a*, and *vridhhi* in prefixing long

a, to another vowel; so that the a melts, together with the original vowel to which it is prefixed, into a diphthong, according to certain euphonic laws. Before vowels, however, these diphthongs fall back again, into their composite elementary form, becoming ay and av respectively. Guna influences are very clear and decided, in the Greek, Latin, Gothic, and Lithuanian languages.

In the Greek, diphthongs have a strong foundation of their own, as phenomenal facts of the language, and maintain their place firmly, not only before consonants, but also before vowels. Any hiatuses thus caused are generally distributed, as we say of the discords of a full-keyed musical instrument, by accentual discriminations, so as to be of a softened kind to the ear. The Greek diphthongs are *αι*, *ει*, *οι*, and *ου*, which are those that occur most frequently in the various dialects; and also *αυ* and *ευ*, which are next in frequency; so that the six genuine diphthongs, belonging to human language as such, are all to be found in Greek. The combinations *υι*, *ηυ*, and *ωυ* occur but seldom, the first two only being found in the Attic dialect; and if called diphthongs at all, as they often are, are but those, as has been said, of an illegitimate character. In Homer *οι*, and in Herodotus *ου*, occur most frequently. The diphthongs ending in *ι* had the preference, of the Greeks, over those ending in *υ*. The diphthongs *αυ*, *ευ*, and *ου*, when not arising from contraction or the lengthening of the *ο* for the purposes of a strengthened utterance, occur at times, at least, from the substitution of the vowel *υ* for its original consonantal equivalent the digamma, as in *Ζεύς* for *Ζεϛς*, Sansk. *devas*, Lat. *deus*.

Diphthongs originate, in Greek, chiefly from contraction. Contraction in the flexion-forms of verbs, if not also in those of nouns, abounds much more in Greek than in Latin. Person-endings, particularly, had but very little tenacity of life in Greek. How much do *τύπτω*, *τύπτεις*, *τύπτει* differ from their originals *τύπτομι*, *τύπτεσι*, *τύπτει*, as also *ἔτυπτον*, *ἔτυπτες*, etc., from *ἐτύπτομι*, *ἐτύπτεσι*, etc.! So also such forms as *η* in the 2d pers. sing. pres. passive for *εσαι*, as in

τύπη for *τύπτεσαι* and *ου* of the 2d pers. sing. imperf. passive, as in *ἔτυπτον* for *ἐτύπτεσο*, have greatly degenerated from their primitive state. In Homer, we often find the medial uncontracted form, which constituted the transition-step from the first full form to the final abridged one; as in *μίσγεαι* and *λιλαίεαι*, Attic *μίσγη* and *λιλαίη* for *μίσγεσαι* and *λιλαίεσαι*, and also in *λύεο*, Attic *λύου* for *λύεσο*, and *ἔλυεο* for *ἐλύεσο*, Attic *ἐλύου*. It is also a very interesting fact that, in Homer, we find the subjunctive present active of a few verbs, as *ἔδέλωμι*, *ἔδέλῃσι*, etc., standing up before us, in full representation of the original forms, according to theory, of the subsequent Attic contractions *ἔδέλω*, *ἔδέλῃς*. It is worth the while, also, to observe the fact of a contrary sort, that sometimes the *σ* of the 2d perf. pass., which is preserved unimpaired in the Attic, is here entirely lost, as in *μέμνηται* for *μέμνησαι*.

The principles of vowel union in Greek are simple, and are embraced in the following rules :

1. Two like vowels melt together into a long one of the same class : as *λάας*, *λάς*; *ζηλώω*, *ζηλῶ*; *φιλέητε*, *φιλήτε*. Exceptions: doubled *ε* becomes *ει* and doubled *ο* becomes *ου*, as indeed both *ε* and *ο* when followed by *ο*, and *ο* followed by *ε* become likewise *ου*, as in *φίλεε*, *φίλει*; *πλόος*, *πλοῦς*. Before diphthongs also a vowel, like the first one of the two, is obliterated, while the memory of the fact is preserved by affixing the circumflex accent to the diphthong; as in *πλόου*. *πλοῦ*, and *φιλέη*, *φιλήη*.

2. Unlike vowels form when in combination a diphthong, and the dark heavy one overpowers the bright or light one in the union; so that

- ¹ *α* becomes *ω*, as in *τιμάομεν*, *τιμῶμεν*;
α becomes *ω*, as in *αἰδῶα*, *αἰδῶ*;

¹ The analysis of such contracted forms as *τιμῶμεν* or *αἰδῶ* is this: that, in the first place, the *α* was assimilated to the *ο*, as so often happens to consonants one towards the other; so that each word became respectively *τιμάομεν* and *αἰδῶο*, from which point it was but a second step, of graphic convenience, to change *οο* in them both to *ω*; since *ω* is in fact but a short mod. of writing two *ο*'s in one, and so doing to the eye in *ω*, as a lengthened *ο*, what had been previously done to the ear, in sounding *οο* in one protracted utterance.

οη becomes ω, as in δηλόητε, δηλώτε ;
 ου becomes ω, as in τιμάου, τιμῶ ;
 εο becomes ου, as in γένεος, γένους ;
 οε becomes ου, as in δήλοε, δήλου ;
 εου becomes ου, as in χρυσέου, χρυσοῦ.

The vowel ο always gives, indeed, a determinate character to all contract forms into which it enters, as one of the combining elements. In forms where the vowel α enters without ο and occurs first, it decides the contract form to be of its own kind ; as does likewise ε when that stands first, in combinations that do not contain ο. Thus αε, αη, αει, and αη become α and α when contracted, as in ἀέκων, ἄκων ; τιμάητε, τιμάτε ; αἶδω, ἄδω ; τιμάης τιμάης ; and so εα, εαι, and ηαι become η and η, as in κέαρ, κῆρ ; τύπτειαι and τύπτηαι, τύπτῃ.

As, in Greek, the short Sanskrit a is often represented by ε ; so here we find the influence of guna, in the lengthening or strengthening of a radical ι or υ, by prefixing an ε to it. Thus, as in Sanskrit, the ê of êmi, I go, is formed by prefixing guna or short a to the verb-root i, to go ; with which form of the 1st pers. sing. pres. compare also the 1st pers. pl. imas, we go : so in Greek εἶμι, the ε represents guna, and the 1st person plural ἴμεν, we go, compares with it, as the two persons compare with each other in Sanskrit. So in φεύγω (stem φυγ) the ε is inserted by guna : compare Sansk. budh, to know, with bôdh (for baudh, by guna), as found in some of the tenses. Vêda, I see (Gr. οἶδα for Fοἶδα), represents in the same way vaidā, formed by guna from vid, to see, Lat. video. In the same way λείπω for λείκω (Lat. linquo, pure stem, liq.), compares with the pure stem λιπ for λικ. In αἶδω (Sansk. indh ; properly, idh, to burn), with which compare ἰαίνω (for ἰδαίνω), to warm, we have also plainly the proper guna vowel a ; as also in αὔω, to set on fire, Sansk. ush, to burn ; with which compare, in Latin, uro ; supine, ustum, and aurum, gold, as a form derived by guna from uro, and also aurora.

The diphthong-system of the Latin is very meagre in its proportions. Hiatus seldom occurs ; the half-vowel i is

freely rejected, and the previous vowel is lengthened, as in *amās* for *ama-is*, 2d pers. sing. pres. indic. of *amo*. The Latin diphthongs, so called, are *ae*, *oe*, *au*, *eu*, *ei*, and *ui*, the first four of which existed in the classic period; and only the first three, *ae*, *oe*, and *au*, are properly entitled to consideration, as having any real living value in the language. Of all genuine diphthongs in Latin, as in Greek and Sanskrit, either *a*, *e* or *o* is the initial letter, and *i* or *u* the terminal. The diphthong *ae* never represents the combination of *a* and *e*, but only that of *a* and *i*; as is seen by comparing it with equivalent Greek forms in *ai*, and also in old Latin inscriptions, where *ai* stands for the later form *ae*, as in such ancient forms as *aiternus*, *aidilis*, *quairo*, and the archaic datives, *aulai*, *terrai*. So also *oe* represents not a fusion of *o* and *e* as such into one sound, but of *o*¹ and *i*; and *oe* sometimes runs into *ae*, as a lighter form, and even into *ê*. Thus compare *coelum* and *caelum*, *proelium* and *praelium*, *foemina* and *femina* (Gr. *φύω*, Sansk. *bhû*), *coena*, *caena*, and *cena* (originally, without doubt, *coesna* = *con*, together, and *edo*, to eat): *oe*, also, signifies sometimes the combination of an original *u* and *i*, as in *poena*, *punire*, Sansk. *pû*, to purify, and *moenia*, *munire*, Sansk. *mû*, to bind; so that *poena* and *moenia* are for an original *puina* and *muina* like *ruina*. The diphthongs *ae* and *oe* must be regarded, therefore, as abnormal in Latin.

Long *ē* represents, occasionally, the combination of *a*+*i* in the flexion of verbs, as in the pres. subj. act. of the 1st Conj. *amēm*, *amēs*, *amēt* for *ama-im*, *ama-is*, *ama-it*. In the future of the consonantal conjugation (the present third), as in *legam*, *leges*, *leget*, we have in the 1st pers., as throughout the pres. subj. of this conjugation, *legam*, *legas*, *legat*, etc., *a*+*i* changed to *ā*; while, in all the persons of the fu-

¹ As in *coelum* (Gr. *κόηλος*); *coetus* for *co-itus* (*co-co*); *foedus* (cf. *fides*, Gr. *πίστω*, perf. *πέποιθα*, stem *πίθ*); *poena* (*ποινή*). An original *oi* was in some cases afterwards changed to *u*, as in *oinus*, first form of *unus*, *oitilis* (*utilis*), *plourimus* (*plurimus*).

² *Ama* is the verb stem and not *am*, as stated in our ordinary grammars; and *-im* is the person ending (*mi* abridged), with the union vowel or mood-vowel *i* combined with it, as in *sim* (for *es-i-m*), *velim*, etc.

ture besides the first, we find the same combination represented by \bar{e} . In the corresponding subj. forms pres. of the 2d and 4th conjugations, as in *doceam*, *audiam*, etc., we obtain by analysis a similar result; as *doceam* for *doce-a-im* and *audiam* for *audi-a-im*. The verb-stems are *doce-* and *audi-*; *a* is an union vowel uniting the verb-stem to the mood vowel and person ending. With stem, *stes*, *stet*, subj. pres. act. of *sto*, *stare* for *sta-im*, *sta-is*, etc., compare, for similarity of form, *σταίνην*, *σταίνης*, etc.; the contracted form being, when restored to its full archaic condition, *sta-i-mi*, and *σταίνην* being *στά-ι-μι*. The common style of contraction, which such forms undergo in Latin, is simply the absorption of the second vowel (*i*) and the lengthening of the first (*a*), by way of compensation, into \bar{e} . The diphthong *au* is of comparatively infrequent occurrence and wavers, in some words, between its own form and the vowel *o*, as in *caudex* and *codex*, *lautus* and *lotus*.

In the beginning of words *ae*, *oe*, and *au* are all found, as in *aetas*, *audio*, *poena*; and in the middle, as in *longae-vus*, *inauratus*, *pomoerium*; while at the end of words, *ae* alone is found, as in the gen. and dat. sing. and nom. pl. forms of the 1st declension.

Such vowel-combinations as *ei*, *eu*, and *ui* in Latin, must be remembered as improper diphthongs. The original diphthong *ei* ran readily, in subsequent times, into mere \bar{i} , as in *dico*, at first *deico* (Cf. *δείκνυμι*), and *hic*, at first *heic*; or, if still preserved unaltered, the two vowels were thrown, by a separate pronunciation, out of a diphthongal state, as in *diei* and *fidei*. The combination *eu* is found but in a few words containing a dissolved *v*, as in *ceu*, *neu*, *seu*, which are but contractions of *ceve*, *neve*, *sive*; and also in a few words having an initial *u* compounded with *ne*, as in neuter (*ne-uter*). In *nullus* (*ne-ullus*), *nunquam* (*ne-unquam*) and *nusquam* (*ne-usquam*), words formed in precisely the same way as neuter, the *e* of the negative particle has fallen entirely out. The combination *ui* is found in *qui* and its compounds, and some few other words, as *re-qui-ro*, *nequitia*, etc. In these combinations, the *u* has no

diphthongal effect upon the *i*, or any modifying influence upon it whatever, or indeed any vowel value even of its own. The Romans pronounced *qu* as the French now do, simply as hard *k*; uttering *qui*, *quae*, *quod* as if written *ki*, *kae*, *kod*. Our own pronunciation of *qu* as if written *kw*, is entirely German in its origin. In *cui* and *huic*, for the archaic datives *quoi* and *hoic*, as still found in old Latin inscriptions, *ui* is not radical to the form, but only a contraction of *oi* or *uoi*. *Qui* itself, restored to its earlier state, would be: N. *quos*, G. *quojus*, D. *quoi*, etc. *Oi* was not euphonic to the Roman ear, and therefore, in the middle and end of words, was exchanged for *ui*; which, as a dissyllable, is of frequent occurrence and is pronounced as such in nearly all cases, as in *fui*, *docui*, *fructui*.

Latin diphthongs arise from two sources: contraction and *guna*.

1. Contraction. The first of the two uniting vowels usually absorbs the other; preserving, in its elongation, the combined length of the two, but keeping no traces of the phonetic quality of the one rejected, as *deābus* for *deaibus*, *amānt* for *ama-unt*, 3d pers. pl. pres. of *amo*.

When, however, the second vowel is radical to the form, as such, then it is often retained; and the first one is, in such a case, either rejected, as in *pennīs* for *penna-is* (for *penna-i-bus*) and *famosus* for *fama-osus*; or it is weakened, as in *huic* for *hoic*, *cui* for *quoi*; or else the natural hiatus is endured, as in *diis* and *domuum*.

Hiatus, made by the occurrence of two of the stable vowels *a*, *e*, *o* together, does not occur in proper Latin; such words as *aēr* and *pöta* being merely Latinized Greek words; nor does a stable vowel make such a hiatus, with one of the movable vowels *i* and *u*. *Ai* does not occur except in archaic forms, as *aulai*; and this genitive form in *-ai*, like that in *-as* of *familia*, is but an abbreviation of the full original form in *aīs*, Sansk. *ayas*; with which compare the Greek genitives *-ας* and *-ης* of the 1st declension, and *-οιος*, *-οιο*, and *-ου* of the 2d, and *-ιος*, *-εως*, and *-ις* of the 3d. *Aü* is found only in Greek proper names, as in *Menelaüs*.

When hiatus is allowed, it is commonly either to preserve unimpaired both the radical and flexional elements of a word, although not in euphonic union with each other, as in *radii* (stem, *radi-*; dative suffix, *-is*), or to indicate that an original consonant has fallen out between the vowels, whose concurrence has been thereby made inharmonious, as in *boum*, gen. pl. of *bos*, for *bovum*. In the former case, etymology is honored by the genius of grammar; and in the latter, by that of phonetics.

2. Guna. The effect of *guna*, in strengthening vowel-stems, is more palpable to the eye in Sanskrit, than in Greek and Latin; as its phonetic analyses are all preserved in such graphic distinctness. *Guna* has, in Sanskrit, a double force: (1) mechanical, acting as a counterpoise, to keep the stem or theme from being overborne in sound, by the addition of suffixes; (2) dynamical, bringing out into full relief the idea expressed by the stem as such. The one is outward in its effect, and the other inward; or, still more plainly, one is phonetic in its bearings, and the other intellectual. Besides these objects, the Sanskrit aims at but one other end in *gunaizing* or *diphthongizing* vowels; and that is, to strengthen the stems of its weak conjugation-forms. One of the best specimens of *guna* in Latin, is that found in *eo*, to *go*, stem *i* (Sansk. *i*, to *go*; Gr. *εἶμι*, stem *ι*), in which *e* is for *e+i*; as also *eum*, accus. of *is*, stem *i*, which is for *êi* (originally *eim*), which form Festus indeed gives, although unable himself to explain it, as one which he found in antique Latin. By *guna* Benary ingeniously explains the length not only of such words as *dīco*, *ŕe* for *deico*, and *fīdo* for *feido*, but also *lābor*, *labi*, to fall, compared with *lābo*, *āre*, and *lēx*, law, with its derivative *lēgo*, *āre*, as compared, each of them, with *lēgo*, *ŕe*. Who can help saying, with Corssen: "I see not how any one can explain, otherwise than by *guna*, *fīdes* and *perfidus* in connection with *fīdo*, *confido* and *foedus*." From the root *fid* would come, by *guna* *faid*, for which *foed* in *foedus* stands (Cf. *πέποιθα* perf. of *πειθω*).

As the Latin allows but the smallest possible margin to

diphthongs, the changes wrought by the original action of *guna*, are so overlaid with other changes, and so mutilated, as not often to strike the eye as being of such an origin. They do not therefore always, even when found by careful analysis to exist, carry their evidence full in their face, except to an eye practised to search appreciatingly for them.

In closing this branch of the subject, it will not be unprofitable to present, in one view, a summary of the various resulting forms, of different vowel-combinations in Latin, in alphabetical order.

I. A.

1st, A and I. These form, when united,

- (1) a : as in *legamus* for *legaimus*, *deabus* for *deaibus*.
- (2) e : as in the subj. pres. of the 1st conjugation, *amemus* for *amaimus*.
- (3) ae : as in *pennae* for *pennai*.
- (4) î : as in *pennis* for *pennais*.

2d, A and O.

- (1) â : as in *mālo* for *maolo* for *mavolo*.
- (2) ô : as in *amō* for *amao*.

3d, A and U.

- (1) â : as in *amūnt* for *ama-unt*.
- (2) u : as *arula* for *ara-ula*.
- (3) au and ô : as *lotum* for *lautum* (for *lavatum* from *lavo*, to wash).
- (4) ê : as *obedio* for *ob-audio*.

II. E.

1st, E and I.

- (1) ê : as *docēs* for *doce-is*, *debeo* for *dehibeo*.
- (2) î : as *pernicii* for *perniciei*.

2d, E and O.

- (1) eo : as in *moneo*, *equuleo*, *leo*.
- (2) o : as *speciosus* for *specie-osus*.

III. I.

I and E.

- (1) ie : as in *audies*.
- (2) î : as *vestibam* for *vestiebam*.

iv. O.

O and I.

- (1) \hat{o} : as in dative *dominō* for *domino-i* and *bōbus* for *boibus* for *bovibus*, *nōsti*, etc.
- (2) *u* : as in *prudens* for *providens*, *bubus* for *bovibus* as well as *bobus*.

The vowel-systems of the three classical languages have been hitherto considered structurally. We turn, now, to the next division of our subject.

2dly. The vowel systems of the classical languages, pathologically considered.

The pathology of human speech, if not so various in its forms, as that of the human body, is yet quite as clear and distinct a part of its true history and philosophy.

(1) The doctrine of counterpoises in derived forms. The whole system of checks and balances adopted by the Greeks, in the lengthening and shortening of words, was full of the beautiful effects of phonetic art.

The following are the principal modes in which, when words were lengthened in derived forms, they were at the same time, by way of counterpoise, lightened, in respect to the mechanical weight of one or more of their syllables.

§ 1. In a reduplicated syllable, one or both of the vowels reduplicated, is generally shortened, in both Greek and Latin; so as to balance, by less weight within, the increased volume of the word without; as in *λέλυκα*, perf. of *λύω*, and *γέγραφα* of *γράφω*, and *cēcīdi* and *tētīgi*, perfs. of *cado* and *tango*. A counter effect seems indeed to have been sought, or at least allowed, by the Greeks in a few words within a limited range, the philosophical or normal boundaries of which it is not easy, in all respects, to define, as in *τέτροφα*, *λέλοιπα*, *έώρακα* from *τρέφω*, *λείπω*, and *όράω*. What the necessity was, which the Greek ear felt, for lengthening the radical vowel, in a few exceptional cases like these, it is difficult to say. In such forms as *είληφα*, perf. of *λαμβάνω* (stem, *λαβ*), *είληχα* (*λαγχάνω*), *είρηκα* (*ρέω*), the *λ* and *ρ* were dropped, as not euphonious, from the original regular

forms *λέλαφα*, *λέλαχα*, and *ρέρεκα*, and the *ε* lengthened by way of compensation for the loss, which involved at once the necessity of lengthening also the radical vowel itself, in which the very sense of the word was embosomed, and so increasing its dynamical effect in the new form of its perfect.

§ 2. The vowels of prefixes and suffixes are made constitutionally short, on the same principle of preventing the addition of too great weight to the words to which they belong.

§ 3. When a preposition is prefixed to a verbal root in Latin, the radical vowel of the verb is generally weakened.

(1) A or ae and often e were changed to i: as in *inhibeo* (*habeo*), *accido* (*cado*), *iniquus* (*aequus*), *inquirō* (*quaero*), *adimo* (*emo*).

A was also, in a few cases, changed to u, as in *insulsus* (*salsus*), *insula* (*in sale*), *inculco* (*calx*).

(2) Au was also changed, sometimes to u and sometimes to o, as in *incuso* (*causa*), *includo* (*claudio*), *applodo* (*plaudo*).

(3) O passed, in a few cases, into i, as in *cognitus* (*notus*); and u, as in *exsul* (= *ex+solium*).

(4) U sometimes changed to e, as in *dejero* and *pejero* (*juro*). The influence of prepositions upon the radical vowels to which they were prefixed, was much less in Greek than in Latin.

§ 4. The weight of a person-ending often caused, in Greek, a shortening of the preceding vowel, as in the passive forms *ἴσταμαι*, *δίδομαι*, *τύπτομαι*, compared with the active forms *ἴστημι*, *δίδομι*, and *τύπτω*.

The effect of the person-ending on the previous radical syllable, in some of the Romanic languages, is deserving of notice here, on account of its analogy with what occurs in Greek. Thus in French, compare the *e* in *tenons* and *acquerons*, 1st pers. pl. of *tenir* and *acquérir*, with *tiens* and *acquiers* the 1st pers. singular. So also in the 3d pers. pl. pres. of verbs, as the final syllable *-nent* is entirely silent in pronunciation, the original radical form of the tense is restored again, as in *tiennent* and *acquièrent*. In Spanish, likewise, as in *querimos*, we seek, compared with *quiero*, I

seek, the same fact appears. In German, also, the change of a radical a or u into the middle sound ae and ue, which the Germans call *umlaut* (change of sound), is produced by the addition of a final syllable for purposes of inflection, as in the pl. forms *Länder*, *Wörter*, *Häuser*, of *Land*, *Wort*, and *Haus*.

§ 5. There is a limited class of cases among consonants, where the law of counterpoises seems to be also at work in Latin; and they are all connected with the labial nasal m. As m is a stronger nasal than n, any change from m to n, in compound or derivative words, is of course a weakening. They are such words as *clandestinus* from *clam* (for *celam* from *celo*), *tandem* from *tam*, *princeps* (*primus*+*capio*), *tunc* (*tum*+*ce*).

There is a class of vowel-changes in Latin, that perhaps deserve to be called rather specimens of vowel assimilation than of counterpoises, as *nihilum* (*ne-hilum*), *familia*, from *famulus*, *exsilium*, from *exsul*, *similis*, from *simul*; and so, in Greek, *σῶφρων* (*φρήν*), neut. *σῶφρον*, is of the same sort.

(2) The doctrine of compensations.

In the Greek, when letters radical to the stem were rejected from it, a compensation was made, both phonetically and graphically, to indicate the fact. Counterpoises and compensations are manifestly opposite, in their effect, one to the other: the one preserving the proper equipoise of the different parts of a word when increased; and the other preserving its etymological integrity, so far as possible, when diminished.

In Latin, contracted syllables are long, as well as in Greek; but, as there are not two modes of writing e and o in the former, as in the latter, and as diphthongs (as *ei* and *ou*) are not used to indicate forever alike the contracted and uncontracted constitution of such words or parts of words; both the fact and the form of compensative influences are much clearer in Greek than in Latin. The following are the chief modes of compensation in Greek:

§ 1. The lengthening of the vowel preceding the rejected letter or letters.

The rules for lengthening vowels, compensatively, are the following :

A is generally made long *a*, and, if a monosyllable, circumflexed, as in *πᾶς* for *πᾶντς* ; but otherwise not, in a final syllable, as in *τύψας* for *τύψαντς*.

E becomes *ει*, as in *εἶμι* for *ἐσμί*, *εἰς* for *ἔνς*, *εἰς*, into, for *έντς*, and also the participle suffix *-εις* for *-εντς*, as in *τυφθεῖς* for *τυφθέντς*.

O generally becomes *ου*, but sometimes *ω*, as in *τύππουσι* for *τύππουτι*, and *τύπτων* for *τύπτοντς*.

So also in French, in shortening original Latin forms from two or more syllables to one, the radical vowel is often diphthongized by way of compensation, as in *loin* (from *longus*) ; *foin* (*fenum*) ; *croire* (*credere*) ; *aimer* (*amare*) ; *gloire* (*gloria*) ; *sain* (*sanus*).

§ 2. When, in a medial or final syllable, an aspirate was rejected, instead of being entirely thrown away, it was transferred to a preceding or succeeding syllable, as in *θριξ* (stem, *τριχ*), gen. *τριχός*, *τρέφω*, fut. *θρέψω*, *ταχύς*, comp. *θάσσω*, and *πάσχω* (stem, *πάθ*) for *πάθσχω*. Whether the reason for thus transferring and preserving the aspirate, was one of an etymological or phonetic kind, it is difficult to say.

In English, as in French, compensation is made in pronunciation, although not graphically, for the rejection of the sound of a final letter, as in *robe* compared with *rob*, and *smoke* compared with *smock*.

(3) Variations in the root-vowel, for other reasons than those of counterpoise or compensation.

The most mobile of all the vowels in radical forms is *e*, which when changed, in derivatives, is usually converted into *o*. In Latin, the interchange of *e* and *o*, in this way, occurs but seldom, compared with the Greek; yet it does appear in a few instances, as in *metior* and *modus*, *tego* and *to-ga*, *sequor* and *socius*, *sedeo* and *sodalis*, *bene* and *bonus*. In Greek, however, such variations are abundant, not only in verbs and their nominal derivatives, as in *λέγω* and *λόγος*, *τρέχω* and *τρόχος* ; but also in different parts of the same verb, in several instances, to denote differences of time, as in

τρέπω, Aor. ἔτραπον, perf. τέτροφα. The range of these transmutations, in Greek, is bounded by the three hard vowels, short *a*, *e*, and *o*.

The change of the radical vowel, in such perfect forms in Latin as *egi*, perf. of *ago*, and *cepi* of *capio*, is of another origin than that spoken of above; as they are but abbreviations of reduplicated forms; *egi* being contracted from *e-agi*, and *cepi* from *cecipi*.

Interchanges, like those of *a*, *e*, and *o* in Greek, occur in some of the modern languages of Europe, from the influence of assimilation, as among the Hungarians and Turks, who have both hard and weak forms of words; all the succeeding syllables of which accommodate themselves, in reference to their vowels, to that of the first syllable, and become, according as that is hard or soft, *ó*, *o*, *u*, *e*, *oe*, or *ue*.

(4) Contracted forms.

These arise generally from the rejection of one vowel before or after another; but sometimes also from the rejection of an entire syllable, of two or more letters.

Abridged forms are abundant, in both Greek and Latin. The early Alexandrian grammarians, who invented the whole system of written accents, for the purpose of preserving to posterity their loved old mother-tongue, as unimpaired as possible even in its minutest features, were exceedingly careful to show by the circumflex accent, whenever original forms had been mutilated, that such was the fact. The service that they thus unconsciously rendered to philology, as derived from Sanskrit sources, is for value like that of Homer, in preserving for us the full Ionic forms of his day, which show what the Greek, in its medial transition state was, when decided changes had begun, and old and new forms were struggling together for the mastery; and so make all the more certain the line of connection between the past and the present: the primitive mother-language of the Indo-European family and all its modern representatives.

A contraction is always a contrivance: a plan for removing a difficulty; and that difficulty is an hiatus which, whether for uttering or hearing, is alike disagreeable. A

love of variety is not only everywhere exhibited by the Deity himself, in his works, but has been purposely also planted by him in the very constitution of our nature. We do not naturally like to make the same effort, with the same vocal organ, twice in immediate succession; nor does the ear like a repetitious impression, of the same sort, upon the tympanum. Contractions accordingly, somewhat like slurs in music, serve to make the passage more smooth from one point to another, in the flow of speech.

The forms of contraction and its principles were presented so fully, under the subject of diphthongation, as to need no further treatment.

(5) Strengthened forms.

Vowels may be strengthened in two ways: first, simply; that is, in a stronger utterance of the same sound by its greater prolongation or more forcible enunciation, as in long a, e, i, o, compared with the shorter ones; and secondly, by compounding another sound with them, as in diphthongs. The two combining vowels, which are thus united with others in one emission of the voice, are i and u. Greater emphasis is given to sounds thus agglutinated; and what Goethe says, is proved true, that "a diphthong is an act of pathos in speech."

In such words as *χαίρω* (stem, *χαρ*) for *χαρίω*, *ἀμείνω* (stem, *ἀμεν*) for *ἀμενίω*, *τείνω* (stem, *τεν*) for *τενίω*, *φαίνω* (stem, *φαν*) for *φανίω*, we have by metathesis of the *ι*, a strengthened radical vowel in a class of original forms, that, when having *γ*, *κ*, or *χ* before *ι*, are changed to *σσ*, as in *τάσσω* for *ταγίω* and *ἥσσω* for *ἡκίω*.

The mode of strengthening vowel-forms has been discussed sufficiently, under the head of diphthongs; and the enumeration of this class of vowel-changes is made here, more for its significance as a part of a true analysis of our subject, than for any other reason.

(6) Weakened forms.

§ 1. All vowel-changes, made as counterpoises, are weakenings of the original radical forms.

§ 2. Original forms were also weakened, sometimes, by

the rejection entirely of a radical vowel, as in *sum* for *esum* (old Greek, *ἔσμι*, Sansk. *asmi*). Similarly, the Eng. word *stranger* (Lat. *extraneus*, Spanish, *estrangero*) has lost the radical *e*, which yet, in the verb *estrangle*, is still preserved.

(7) Euphonic additions.

§ 1. Euphonic prefixes. In Greek, *a*, *e*, and *o* were often prefixed to words, in order to give them greater volume to the ear.

The following are specimens of such additions :

	SANSKRIT.	GREEK.	LATIN.
a.	mê, to exchange.	ἀμείειν and ἀμείβειν	meare and movere.
„	mrij, to wipe off.	ἀμέλγειν	mulgere.
e.	laghu (s), light.	{ ἐλαφρός ἐλαχύς	levis.
„	{ rohitas, red. rudhira, blood.	ἐρυθρός	ruber.
o.	naman, a name.	ὄνομα	nomen.
	nakhas, a nail.	ὄνυξ	ungula.
	paschat, near, after.	ὄπισθε	post.
	raj, to rule.	ὄρέγειν	regere.
	bhrus, the eyebrow.	ὄφρῦς	frons.

§ 2. Union-vowels.

An union-vowel is an intermediate vowel, employed to connect the stem of a word and its person-ending together, with which many verbs were originally endowed, in Sanskrit, Greek, and Latin. It is in itself of no value whatever, either etymologically or grammatically, but only in a phonetic way, and therefore readily changeable in its form. It came however, ere long, to have as fixed and influential a status in the word, as any of its other elements; and has served therefore, in some cases, to complicate considerably some of the more abstruse inquiries of the scientific etymologist. Georg Curtius, in his "Die Bildung der Tempora und Modi," first opened to view the hidden riches of this department of philological investigation.

In the Greek verbs in *-μι*, the verb-stem and person-ending are joined together without any such copula: as in *τιθήμι* (stem, *θε*) we have, on the one hand, the verb-stem reduplicated and its radical vowel lengthened, and on the other, the person-ending in its original unchanged form *-μι*, and nothing else. So in Latin, in such forms as *est* and *estis*; *fers* and *fert*; *is*, *it*, *imus*, *itis*, different persons of *eo*, to go, stem *i*, we have the different verb-stems *es*, *fer*, and *i*, in immediate connection with the person-endings *s*, *t*, *mus*, and *tis*, without any union-vowel. In Greek, all verbs of consonantal stems (or barytone verbs) and all pure dissyllabic verbs have union-vowels in some or all of their persons, as in Latin also, have the simple verbs of the consonantal or third conjugation.

The union-vowels, called also technically, in the different-moods, the mood-vowels, are in Sanskrit *a*, in Greek *ε* and *ο*, and in Latin *i* and *u*. In the conjugation of the contract verbs in Greek (*αω*, *εω*, *οω*), as of the 1st, 2d, and 4th conjugations in Latin *ao*, *eo*, and *io*, which are also vowel conjugations like those in Greek, the union vowel is wanting. The stems of these verbs are all vowel stems, or stems ending in a vowel; and remain unchanged throughout all the forms of the verb, with a few trifling exceptions, as in the 1st pers. pres. sing. of *amo*, which is for *ama-o*, and in the tense-stem of the preterite of *doceo*, as in *docui* and *docueram*, which are for *doce-fui* and *doce-fueram*. In Greek, as the union-vowel and stem-vowel of the contract verbs, coming into juxtaposition, made an hiatus which could be endured only for some etymological or other imperative reason; one of the two vowels was sacrificed to the other;

¹ Thus *ἔβούλευον*, *ἔβουλεύει*, etc., analyzed becomes

Augment.	Verb-stem.	Union-vowel.	Person-ending.
ἔ	βούλευ	ο	ν (for μι).
έ	βούλευ	ε	ς (" σι).
έ	βούλευ	ε	wanting (" τι).

So in Latin, *rego*, in its different persons, is analyzable in the same way, as

	Verb-stem.	Union-vowel.	Person-ending.
2nd pers. Sing.	reg	i	s (for si).
3rd " "	reg	i	t (" ti).
3rd " "	reg	u	nt (" nti).

sometimes the union-vowel to the stem-vowel, and sometimes the latter to the former. In *τιμά·ω, τιμῶ, τιμά·ει·ς, τιμῆς, τιμά·ει, τιμῆ*, the stem-vowel *a* is preserved, and the lengthened union-vowel *ει*¹ thrown out; but in *τιμά·ο·μεν, τιμῶμεν*, the stem-vowel is sacrificed, and the union-vowel *ο* is lengthened into *ω*. The stem-vowel has, as it of course should have, the greatest tenacity of the two when they come in conflict; and, except in the subjunctive mood and the participial forms, maintains its own precedence with great uniformity. In Latin also, the stem-vowels of the three vowel conjugations, maintain themselves firmly before the union-vowel; so that it disappears entirely in them, except in the third pers. pl. of verbs in *io, ire*, of the 4th conjugation, as in *audi-u-nt* (for *nti*). *Amo, amas, amat*, are accordingly for *ama-o, ama-i-s, ama-i-t*; so *doceo, doces, etc.* are for *doce-o, doce-i-s, doce-i-t*; and *audio* is for *audio, audi-i-s, audi-i-t*.

III. The consonantal system of the classical languages, viewed severally.

1st Structurally.

(1) Simply. Consonants exhibit a much greater strength of life, in passing from one age, country, or language to another, than vowels, which are of a much weaker constitution. We have, indeed, in these two components of syllabication, that same mixture of conservative and progressive or of stable and mobile elements, which is ordained to form the steady equilibrium of the social state. The consonants or conservatives are more perpendicular in their form, longer-rooted, and of greater rigidity of position; and, when removed, are not readily rolled from their place, but forcibly borne away; while the vowels are easily set in motion, one upon the other, before any strong phonetic impulse to a change.

The Greek and Latin are very much alike, in their consonantal systems; the Latin and Gothic less so, and the Greek and Gothic least of all.

The framework of the consonantal system of all the Indo-

¹ The proper union-vowel being *ε*, it has been made in the 2nd and 3rd pers. Sing. pres. of verbs in the active voice *ει*, by way of compensation for shortening the original person-endings *-σι, -τι*.

European languages consists of three great divisions, represented by the three leading sounds p, k, and t; that is, labials or lip-sounds, gutturals or throat-sounds, and linguals or tongue-sounds, of which the lightest and most flexible is t. Each of these separate orders of consonants has other cognate sounds, that constitute a class with it, as :

	GREEK.	LATIN.
P.	β and φ.	b, f, and bp.
K.	γ and χ.	g and ch.
T.	δ and θ.	d and th.

Each of these classes is subdivided, in the order in which they here stand, into smooth, middle, and rough mutes. They had also, in early Greek, and have more or less now, in various languages, a breathing appropriately belonging to each class. These were, with the labials the digamma *F*; with the linguals, *σ*; and with the gutturals, the rough breathing, our *h*. With the linguals coalesce also *l*, *n*, *r*; and with the labials, *m*. The three fundamental vowels *a*, *i*, *u*, almost agree themselves, also, with this classification:

a is a guttural vowel;

u, pronounced as the Greek or French *u*,¹ is a labial vowel, as is also *o* (= *a*+*u*); while

i is a high guttural vowel compared with *a*, which is a low one.

There can, of course, be no dental vowel, as, in order to utter a vowel, the mouth must be open, and no use is made of the teeth in its enunciation. The consonants may therefore be thus grouped:

	GREEK.	LATIN.
Palatals,	κ, γ, χ.	c, g, ch.
Dentals,	δ, τ, θ, λ, ν, ρ, σ.	d, t, th, l, n, r, s.
Labials,	β, π, φ, μ.	b, p, f, ph, m.

¹ The French *u* may be at once rightly pronounced by fixing the mouth as if going to whistle, or as when pouting or kissing, and while keeping it in that position saying *e*. It is accordingly sometimes called the pouting vowel.

Of the three great classes of consonantal sounds, the linguals are the most light and flexible, and the gutturals the most hard and heavy; so that the labials are intermediate between them both, in ease of utterance and in degree of syllabic effect or weight. The k-sounds, accordingly, occupy the highest point of the consonantal scale for force; and the t- and p-sounds may be viewed as successive reductions of vocal force.

It has been said, that the consonantal elements of words form the groundwork of language, and the vowel-sounds its superficial coloring; and also that the Sanskrit is the most simple of all languages, in its vowel-system; its great all-prevailing vowel being a, to which however the Latin and Greek languages, in their greater sensitiveness to consonantal influences of all sorts, respond at various times with the whole scale of vowel-sounds. Although, therefore, in respect to the number of its consonants, the Sanskrit is very copious, yet from the great prevalence of the a-sound in all its forms, it is poorer in the elements of phonetic beauty than any other language of the same family. Likè tunes that must be all played upon an instrument of only one string, its consonantal effects can be developed in only one limited direction.

As, in diphthongal combinations, there is a stable element in union with one mobile, so, in consonantal mixtures, there occurs a similar difference of firm and weak, or of fixed and incidental. Thus the semivowels ($\lambda, \mu, \nu, \rho, \sigma$) are so feeble, as their name indicates, as to be midway in strength between consonants and vowels, or, which is the same thing, to have less mechanical weight than the other consonants. The semivowels, like the vowels, can be uttered continuously, so long as the breath can be expired; while the mutes are capable, in themselves alone, of only one definite explosive utterance.

The lightest of all the consonants in mechanical weight, the most bodiless in sound, are j and h. In Sanskrit, j is so weak that it occurs even initially after n and m. Next in lightness of vocal substance are r and l, and in this order. They readily change, in different languages, into each

other, as do likewise r and s in Latin; and other letters also drop, from weakness, into them; while, contrarily, no tendency appears, anywhere, to rise or harden into them. As the mutes are heavier than the semivowels, the two readily combine with each other, some in one language and others in another; while in Sanskrit, where scarcely any consonantal combination seems impossible, they are all of them, or nearly all, found in conjunction in initial syllables, as tn, tm, ts, tsn, mm, ml, hm, hl, ddh, dbh, rdr, rtsn.

There are, strictly, but two simple nasals, m and n; but in Sanskrit, by assimilation with other letters combined with them, a fivefold variety of nasals has been created. Of these m, the labial nasal, is stronger in mechanical force than n, the dental nasal. We find accordingly in Greek, when the two occur together, as they do even initially, μ preceding the ν , as a staff upon which it may lean, as in $\mu\nu\acute{\alpha}\omicron\mu\alpha\iota$ and its derivatives, and also $\mu\nu\acute{\iota}\omicron\nu$ and $\mu\nu\acute{\omicron}\omicron\varsigma$. In Latin no consonant can precede a nasal in the same syllable, except g; and this occurs only before n, as in gnarus and gnosco, the archaic form of nosco (cf. $\gamma\gamma\nu\acute{\omicron}\sigma\kappa\omega$). The compound nasal ng (as in our word anger), is found abundantly in both Greek and Latin, as in German and English; as in $\acute{\alpha}\gamma\gamma\epsilon\lambda\omicron\varsigma$ and longus.

(2) In combination. The modes of consonantal combination are threefold :

§ 1. The concurrence of any two different consonants.

§ 2. The duplication or gemination of the same consonant.

§ 3. The union of two consonants into one compound sound, as ψ ($\pi+\sigma$), ξ ($\kappa+\sigma$), ζ ($\sigma+\delta$). As ζ so abundantly represents (in Greek) the Sanskrit j and Latin j, it is probable that its sound was dsh or j.

Consonants, blending into one sound, may be compared with those standing together uncombined, as a diphthong compares with two vowels separated from each other by diæresis, as $\pi\acute{\alpha}\iota\varsigma$ with $\pi\acute{\alpha}\iota\varsigma$.

It is in the first of the three modes of consonantal combination described, that the chief interest of the investigator lies; and this in three different directions :

- (1) In reference to the beginning of words.
- (2) In reference to the middle of words.
- (3) In reference to the end of words.

There will be a double advantage, it is believed, not only in form but also in fact, in surveying this part of the subject, both synthetically and analytically.

First, synthetically, or generally.

1. In the beginning of words.

Initial combinations of consonants are much more varied and abundant in Greek than in Latin. Beside those to be found in Latin, the following also occur : βδ, as βδέω ; δμ, δμωή ; δν, δνόφος ; δρ, δράω ; κμ, κμητός ; κν, κνάω ; μν, μνά ; πν, πνίγω ; πτ, πτύω ; τμ, τμήγω ; and τλ, τλάω ; and likewise the double consonants ξ (κ, γ, χ, and σ) and ζ (σ and δ) as in ξένος and ζάω. In Latin, not only would all of the above initial combinations be abnormal ; but there is also very much less fondness for such combinations generally, except when the second letter is a liquid ; and then the first is always one of the labials (b, f, or p) or of the gutturals (c or g), or the letter s or t. But never, as in Greek, can d or m be initial, and at the same time be followed immediately by another consonant ; or any letter come after g or t, in the same initial syllable, but r. With l or r, any consonant may be blended initially, except t and d with l. No consonant can be doubled, when initial, in a word ; for no such duplication of a letter could be made or heard, without the intervention of a vowel, which would at once destroy the very fact of its duplication. In some of the modern languages, indeed, as the Spanish, double letters occur initially, as in llano, plain (Lat. planus), and llave, a key (clavis) ; but the letter thus doubled to the eye, is not also double to the ear, but a distinct letter by itself, or graphic symbol, for the representation of what is called the liquid l, or ly : llano being pronounced as if written lyah-no as a dissyllable.

2. In the middle of words.

Consonantal combinations, in the middle of words, are more nearly the same in style and number, in the two lan-

guages, than in the beginning; although the range of the Greek is wider also here than that of the Latin. Thus *d* and *r*, while frequently meeting in Greek, in the middle of a word, occur in Latin in but two words, *dodrans* and *quadrans* with its derivatives; and so *bl*, *cl*, *gl*, and *ld*, and *cn* never occur in pure Latin forms, that are uncompounded. *Cocles*, a proper name, in which *cl* occurs once, may be a contraction for *caecus oculus*, as in *poclum* and *saeclum*, occasional poetic forms for *poculum* and *saeculum*; or it may be of other than Latin origin. *Publius*, in which *bl* also occurs once, is a contraction for *Populicus*, as *ld* likewise in the one word *valde comes*, by contraction, from *valide*. But how often, in Greek, do we find such combinations, in the middle of words, as *δμ*, *δν*, *κμ*, *κν*, *πν*, *τμ*, *τν*, *τλ*, *σγ*, *σθ*, *σθλ*, *σμ*, as in *ἴδμεν*, *ἔδνα*, *ἀκμή*, *ὄκνος*, *ὑπνος*, *ἀτμός*, *φάτνη*, *Ἄτλας*, *μίσηγομαι*, *λοῖσθος*, *ἑσθλός*, *ὄσμῆ*.

The duplication of the same letter, in the middle of a word, does not occur in Latin, on any such scale as in the Greek. The letters *d*, *f*, *g*, *l*, *m*, *n*, *p*, *r*, *s*, *t* are indeed often thus duplicated, but almost always only because of a prepositional prefix, whose first letter is assimilated; and when duplication does occur in the middle of a word, it never exists in the same syllable. In this particular the French has departed widely from the phonetic law of its parent tongue; for in French, duplicated letters in the middle of a word are put together in syllabication undivided, with the following vowel: thus, *vaisseau* is spelled *vai-sseau*; and *fille*, *fi-lle*.

(3) At the end of words.

The Latin allowed here a far greater number of consonantal combinations than the Greek. In neither was the doubling of the same letter when final, so common in the Teutonic languages, allowed. *Mel* accordingly (stem, *mell*), *fel* (stem, *fell*), and *os*, a bone (stem, *oss*, Gr. *ὀστέου*, Sansk. *asthi*), each gave up in the nominative, their final radical letter under the force of this law. Of all combinations of final letters in verb-forms, that of *-nt* was the favorite in this language. In nouns, *s*, preceded by a liquid as in *mens* and *pars*, or, itself compounded with a guttu-

ral and then so preceded, as in *arx*, *lanx*, etc., occurred quite frequently.

In Greek, the addition of the gender sign σ caused at once the rejection, for the sake of euphony, of the final letter of the root, in consonantal stems, as in $\Theta\acute{\iota}\varsigma$ (stem, $\Theta\iota\nu$) for $\Theta\acute{\iota}\nu\varsigma$, $\pi\acute{\alpha}\varsigma$ (stem, $\pi\alpha\nu\tau$) for $\pi\acute{\alpha}\nu\tau\varsigma$, $\lambda\alpha\mu\pi\acute{\alpha}\varsigma$ for $\lambda\alpha\mu\pi\acute{\alpha}\delta\varsigma$.

The most frequent of all consonantal combinations, are those of mutes with liquids or with the semivowel *s*.

Mutes combine with liquids on the principle that, in the beginning of words, the mutes must precede the liquids; while in the middle and end, contrarily, the liquids must precede the mutes; or, which is the same thing in effect, the liquid must always be in immediate connection with its syllabic vowel, whether preceding or following it, as in *artem* and *trado*. In neither the Greek nor Latin can one of the semivowels *l*, *n*, *r*, or the letter *h* be combined vocally, as first of the two in the same syllable, with any of the mutes.

Secondly : analytically, or, particularly.

I. The combination of mutes and liquids.

1st. Mutes and liquids in the beginning of words.

1. *l*. In Greek and Latin we have *bl*, *pl*, *fl* ($\phi\lambda$), *gl*, *cl*, (*kl*), $\chi\lambda$, and in Greek alone $\tau\lambda$ ($\tau\lambda\eta\tau\acute{o}\varsigma$) and $\Theta\lambda$ ($\Theta\lambda\acute{\iota}\omega$).

2. *m*. In Greek only, we find $\delta\mu$ ($\delta\mu\acute{\alpha}\omega$), $\tau\mu$ ($\tau\mu\acute{\eta}\gamma\omega$), $\kappa\mu$ ($\kappa\mu\eta\tau\acute{o}\varsigma$).

3. *n*. In Greek and Latin *gn* ($\gamma\nu\acute{\omega}\sigma\iota\varsigma$, *gnosco*), and in Greek $\kappa\nu$ ($\kappa\nu\acute{\alpha}\pi\tau\omega$); as also dental and labial combinations with *v*, as $\delta\nu\acute{o}\phi\omicron\varsigma$, $\Theta\nu$ ($\Theta\nu\eta\tau\acute{o}\varsigma$), $\pi\nu$ ($\pi\nu\epsilon\acute{\upsilon}\mu\alpha$).

4. *r*. In both languages, the mutes generally are capable of uniting initially with *r*.

The combinations with *l* and *r* are most abundant.

2d. Mutes and liquids in the middle and end of words.

In both Greek and Latin they occur abundantly in the middle of words; where they can stand between two vowels.

In Latin, some combinations of the kind are found, at the end of words, but not in Greek: *as*, *nt* (*amant*), *lt* (*vult*), *rt* (*fert*), *nc* (*nunc*). In union with final *s*, the same combinations and quite a wide range of others also can be found, in both languages, as *rb* in *urbs*, *rc* in *arx*, *lc* in *calx*, *nc* in *lanx*, *rt* in *ars*, etc.

II. The combination of different consonants with s.

1st, s can precede mutes, in the beginning and end of words. If it follows them, it unites with them into a double consonant.

(1) We find in both Greek and Latin, sp, st, sc (sk), occurring initially, and each admitting an l also in threefold combination: like, for consonants, the triphthongal combinations among vowels (as *εοι, εαι*), sometimes found in Greek. The following triconsonantal mixtures are found accordingly in Greek and Latin respectively: spl (*σπλάγγχρον* and *splendo*); spr (*spretus*); stl (*στλεγγίς* and *stlembus*); str (*στρώνυμι*, *stratus*); skl (*σκληρός*); ser (*scribo*); skn (*σκνίπτω*). In the Greek we find also σ, in combination with the aspirates, as σφ, σθ, σχ, as in σφήξ, σθένος, σχαδών.

(2) In the end of words, st, in which the sibilant precedes the mute, occurs in Latin (*ast*), but not in Greek. With the mute preceding s, we have in Greek ψ and ξ. As for ζ, while it represents σδ, it never does δς. In Latin, beside x (= c+s and g+s), we find also bs, as in *coelebs*.

2d. The combination of s with liquids, is of two kinds:

(1) In the beginning of words, σ can precede μ in Greek, as in *σμάω*. In *suadeo* and *suavis* in Latin, we have σ preceding the liquid v-sound.

(2) At the end of words, in the combination of s with a liquid, the liquid must precede. The only combinations of this kind in Greek are those in λς and νς, as in *ἄλς* and *ἔλμυς*; and in Latin, those in ns and rs, as in *mous* and *pars*.

III. The combination of two mutes.

This is of more infrequent occurrence than the other combinations. The classes of mutes that thus unite together, are always either labials or palatals, on the one hand, and dentals, on the other; and they must always be homogeneous, in reference to being smooth, middle, or rough. The combinations of this kind, and the only ones that occur in Greek, in the beginning and middle of words, are the following: βδ, γδ, πτ, κτ, φθ, χθ. Of these, γδ occurs initially but in one word and its derivatives in Homeric Greek, *γδοῦπος*. Not one of these consonants can

occur in Latin, in the beginning or end of words, but only in the middle; where *bd*, *pt*, and *ct* (*kt*) are to be frequently found. Here too the law of homogeneousness is in force, as in *scriptum* (stem, scrib) and *rectum* (stem, reg).

Harsh consonantal combinations are not only allowable in Sanskrit, but even very abundant; while in Greek and Latin they were commonly avoided. Excepting the verb-roots *έσ-* to be, and *ιδ-* to see, in Greek; and *es-* to be, *fer-* to bear, and *vel-* to wish, in Latin, no verb having a consonantal stem can have a person-ending attached to it in any tense, without the intervention of an union vowel, except in the perfect passive in Greek; where, when the person-ending is affixed, the final consonant of the stem is modified, and harmonized euphonicly with the initial consonant of the personal suffix. In Sanskrit, such unharmonized forms as *τέτυπμαι*, *τέτριβμαι*, *πέπλεκμαι*, *τέτυχμαι*, would be entirely proper; but not in Greek, where they are changed immediately, by the inexorable laws of phonetic instinct, to *τέτυμμαι*, *τέτριμμαι*, *πέπλεγμαι*, and *τέτυγμαι*.

A syllable is, as the word in its very etymology (*συν* and *λαμβάνω*, to take together) defines itself to be, the taking together of a consonant and a vowel, for the production of one whole united sound. Says Heyse, quaintly: "a mere vowel forms a naked syllable: united with a consonant, the syllable is clothed. When a consonant precedes the vowel, the syllable is open, and closed when it follows; while, when having a consonant both before and after it, it is enclosed." Syllables, alone or in combination, form all the varieties and uses of words. In every language, words can end in vowels. As for consonants, the liquids and *s* can freely stand at the end of words; and, in a few words, *b*, *c*, *d*, and *t*, as in the prepositions, are found as final letters. In Greek, only *σ* and the liquids *ν* and *ρ* are found, except *κ* in a few particles.

THE SANSKRIT CONSONANTAL SYSTEM.

In Sanskrit, the consonants are arranged according to the organs used in uttering them, into five classes. A sixth

class is adopted to include the semivowels, and a seventh, the sibilants and h. In the first five classes, the single letters are so arranged, that the first are the hard, the medials and their aspirates ; and next, the soft, the medials and their aspirates ; each class being completed by its nasal. The nasals belong, like the vowels and semivowels, to the soft, and the sibilants to the hard. Every medial letter has its corresponding aspirate. The aspirates are pronounced, with a clearly audible h, and are easily exchanged with each other, as in bahr and dhar, to bear, and also han and dhan, to kill.

Before, however, enumerating the different classes of consonants in Sanskrit, in reference especially to their correspondents in Greek and Latin, it will be well to consider carefully a synopsis of the general consonantal system of the Indo-European languages, prepared by Heyse, who is not only one of the latest writers on phonetics, but also one of the best, on those parts of the science which he touches. It is designed to be a complete view of the true consonantal system, on which, in various degrees, the different languages of the Indo-European family are formed ; no one of them exhibiting the whole of it ; but, as in the stratified records of geology, the parts of the system are furnished, each in their appropriate place, from different directions.

A. Continuous sounds.

- | | | | |
|---|-------------|---------------|-------------------|
| i. Breath-sounds.
or, breathings and sibilants : | Lip-sounds. | Teeth-sounds. | Roof-
[sounds. |
| incomplete articulation,
expressed by breathing. | f, | sharp s, | ch, |
| ii. Voice sounds,
or intonated consonants. | | | |
| 1st, Half-vowels : | v, | z, | j, |
| incomplete articulation,
expressed by the voice. | | | |
| 2d, Liquids : | | | |
| complete articulation,
expressed by the voice ; | | | |

Lip-sounds. Teeth-sounds. Roof-

[sounds.

as (2) made by the nose, nasals; m, ¹n, ng;
 as (1) made by the mouth, orals; l, r;

B. Explosive sounds.

II. silent or paralyzed sounds

Mutes : complete articulation, with
 accompanying breath.

(1) With the soft breathing.

(a) weak (middle) : b, d, g.
 (b) hard (smooth) : p, t, k.

(2) With the rough breathing.

Aspirates :

(a) weak, bh, dh, gh.
 (b) hard, ph (ϕ), th (θ), kh (χ).

All the above consonants are pure or simple. The entire system is developed in no one, by itself, of the old or new European languages; but to the fullest degree in the Sanskrit.

¹ Rapp distinguishes the nasals and liquids as consonants, which draw in the breath or at least hold it back, while the others drive it forth.

[To be continued.]

NOTE.— In the Article on the Indo-European languages, and also that on the Science of Etymology, some mistakes occurred in printing, to which attention is here called for their correction. On page 769 (1857), line 8, "or a smooth mute," etc., should read *on*, etc. On page 111 (1858), "from the root *str*," should read *stu*, etc. On page 114, in note, "as in *sarstro* mi," should read *carstro* mi. On page 120, "*with*," in a line with Sansk. *vash*, Gr. *εβχεσδαι*, etc., should be *wish*. On page 126, "*that* greatest possible amount of good, etc , should read *the* greatest, etc. On page 401, in the Science of Etymology, *correspondencies* should be *correspondences*. On page 402, "great *people* and languages," should be *peoples*, etc. Also, "*firm* aesthetical," should be *fine*, etc. On page 416, "Diversions of *Perley*," should be of *Purley*. On page 420, make "*specialities*," *specialties*. On page 427, in French column, make "*jong*," *joug*. On page 428, in Sanskrit column, make "*hausas*," *hansas*. On page 443, make "*sweet bells though heard far off*," etc., *when* heard, etc.