Dumézil and the Details

An Analysis of the Comparative Technique in Linguistics and Mythology

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The name of Georges Dumézil is immutably linked to the reconstruction of the tri-functional social ideology of the Indo-Europeans, which he posited and then so thoroughly and elegantly documented over the course of his long career. Because of this legacy Dumézil looms large as the master of the grand design, one who took the recondite and sometimes detail obsessed world of Indo-European studies and lifted it to a level where an overarching sense could be brought to that remote and enigmatic world of the cultural forebears of so many in Eurasia. Yet, when one reads through the work of Dumézil, one is forcefully struck by the rich detail of the individual studies of Indo-European myth, whether studies of the full panoply of the Nart Sagas of the Ossetians (1930; 1943; 1952; 1956; 1958; 1960; 1965; 1978) or of narrower matters regarding heroes in the Mahābhārata (1970a; 1971a; 1971b) or in the Norse sagas (1970a; 1970b; 1973b). In short, Dumézil was a master in the study of details, even if such details often served as road markers along the route to the great tri-functional goal. I shall argue that the study of such detail is just as important a part of Dumézil's legacy as is the scheme of tri-functional social ideology (1968). Specifically I shall examine what comparative linguists and mythologists do, and by means of some simple mathematics try to prove that the examination of certain types of detail is in fact the fundamental principle upon which all comparative work rests. In particular, I shall try to argue that in mythology it is precisely the odd, unmotivated elements in a myth that constitute the best data for comparative work.

First, I shall trace the familiar well worn path taken by the historical linguist, since

comparative mythology turns to linguistics as its paradigm. Then I shall perform the same task for myth. Certain basic differences, somewhat surprising, will be seen to emerge.

The process of linguistic comparison may be broken down into the following steps:

(1) The linguist starts by spotting similar words among languages. 'Similar' here can be quite squishy, so to speak, with some languages, such as Latin, Greek, and Sanskrit (the original trinity of Sir William Jones) literally having words with "like" meanings showing the same consonants and only slight differences in vowels, whereas other comparative efforts, such as that needed to show the Indo-European status of Armenian (Meillet 1936) or Albanian (Hamp 1965; Huld 1983), can be at the extreme limits of linguistic insight.

(2) The number of such words reaches a 'critical mass' at which point the languages in question are thought to be related and the words are elevated to the status of cognates. What this critical mass is appears to be a matter of taste and to a large extent also depends on the 'quality' of the comparisons (core vocabulary, roots plus a few suffixes, forms related within a paradigm, but more of this last anon).

(3) Sound correspondences are defined across 'daughter' languages by grouping the cognates into sets which exemplify or, perhaps better, substantiate the correspondences, for example Germanic /f/ ~ Latin /p/ ~ Greek /p/ ~ Sanskrit /p/ (more rarely /ph/)).

(4) For each correspondence a proto-phoneme is postulated. Often, as in the previous example, a democratic impulse leads to the most common sound being chosen, since how could so many diverging dialects shift in precisely the same way. Sometimes geographic marginality (defined by Johannes Schmidt's wave theory, see Mallory 1989: 19-21) dominates and a peripheral relic carries the day. In certain cases, often for typological reasons, a more subtle effort must be made: for example what would yield the attested sounds and yet still be part of a sensible phonemic inventory?

The correspondence cited in (3) lies behind the first member of the classical Indo-European triad */p, (b), bh/. Such a system of source feature contrasts, however, is unknown in the world's languages. This, coupled with the Germanic hint of aspirates, leads to the Gamkrelidze - Ivanov revision of the Indo-European pattern to */ph, (p'), b/.

Such difficult choices look very much like phonology problems from synchronic work. In fact advances in this part of historical work lean heavily upon phonological theory. The true nature of the Indo-European laryngeals springs to mind as an area where phonology will decide what the proto-phonemes will look like beyond the level of mere symbols that stand for correspondences (what they were once thought to be)(Colarusso 1981; 1997).

(5) Once a proto-phoneme is chosen, then it is linked to its reflexes (its descendants) by sound laws (which underlie the family trees of August Schleicher, see Mallory 1989: 14-20). (Even Indo-European */p/ > Greek /p/ is as much a sound law as Indo-European */p/ > Germanic /f/).

(6) Once such laws are posited, then deviant forms can be coherently defined. These consist of four types: borrowings, submerged dialect forms (a form of borrowing), forms distorted by analogy (somewhat like internal loans), and conditioned forms.

(7) The last is merely a more complex form of (5). Separate laws are needed wherein an extra feature, a conditioning environment, produces a result different from the correspondences in (3). The first instance of such a law was Verner's, where proto-pitch after a stop caused a voiced fricative reflex in Germanic (English harvest, Greek karpós). While seemingly a minor pothole on the comparative path, this feature, historically, elevated historical linguistics to the level of a science by replacing what seemed like a degree of randomness with rigor.

(8) Proto-forms can now be reconstructed. These consist of a root and at least some

of the affixes to which it was subject, usually by derivational morphology. Such a step opens up the reconstructive effort from its initial stages of mere vocabulary work to the rich fields of grammatical retrieval itself. I shall show with some simple arithmetic that the information yielded by such an effort also jumps dramatically.

(9) A mother language can now be erected with vocabulary, paradigms and to some extent syntax (note the pioneering efforts of Watkins (1964; 1982), Lehmann (1974), and Friedrich (1975) in this area).

(10) The path from this mother to its daughters can now be traced, with well defined sound shifts, levelings in morphology and reworkings to the same, and with shifts in the patterns of syntax.

(11) The path delineated by the two end points in (10), the mother language and its attested daughters, can be shown to have coherent intermediate stages, often attested by relic, frozen forms of morphology or phraseology. Sometimes a quiet valley can even be found where a quaint dialect proves to have retained many features of one of these intermediate stages. In fact, variety preserved in space from earlier stages along this path in time is the very fabric of dialectology itself.

Turning now to comparative mythology and the work of Dumézil, no one can seriously deny many of the "more solid" comparisons and reconstructions that he (and others, such as Stig Wikander 1938) posited. Certain similarities in figures and plots across the Indo-European mythology landscape are so striking that only historical descent from a common ancestor can explain them. Nevertheless, a careful comparison of such reconstructive efforts show some odd deviations from the linguistic paradigm.

(1) Similar figures can be found, and these are similar because they bear similar attributes or engage in similar plots. But, where similar figures are absent and only comparable plot lines persist, the issue becomes clouded and the typology of folk motifs raises its head. Similar plots without similar characters, therefore, are often dismissed as typological coincidences.

(2) Now when similar plots contain characters with some vague similarities, but many evident differences, then Jaan Puhvel's term of 'comparand' (Puhvel 1987) becomes useful. Here Kevin Tuite's work (1998) on the shining hero (Greek <u>Akhilleus</u>) is a prime example. Shining heroes appear in various Indo-European traditions (Roman <u>Camillus</u>), but their specifics often differ radically. These contrast with shining twins which show strong signs of being reflexes of the Dioscuric Twins (Latin <u>Castor and Pollux</u>, Greek <u>Kastor and Polydeukes</u>, the Vedic <u>Ashvins</u>). In short, myths seem to show the persistence of aesthetic or dramatic standards that can outlive their earlier exemplars. In some way the inheritors of these traits clearly owe their form to their ancestors and in this sense are historically reflexes of them, but it would be excessive to call them cognate figures. By contrast cognate figures share features in abundance, including names, often showing weak similarities in plot or role (Indo-European *<u>Dyews</u>, with his divergent reflexes: English <u>Tues(day)</u>, Irish <u>(Dago)da</u>, Latin <u>Iu(piter)</u>, <u>Iove</u>, Greek <u>Zeus</u>, Vedic Sanskrit <u>Dyaws</u>, Latvian <u>Dievs</u>, Hittite <u>shiush</u>). Here, unlike in language, Puhvel's concept of comparand has a theoretically crucial role to play, so that myths show both comparands and cognates as forms of historical descent.

(3) As to sound correspondences, myths lack such apart from figures whose names are cognates. A feature may be reassigned in one tradition or plot scrambled in another, but the bits and pieces must remain recognizable, and hence unchanged.

(4) Mythic traditions allow enough similarities to be culled from them so that an image of the original figure or plot can be discerned, although often with great difficulty. So proto-forms can be posited, as they can in linguistics, but often marginality offers little help. For example, the marginal Keltic tradition (Irish, specifically), shows a host of women who are wild, belligerent, and over sexed, setting this corpus apart from anything else in the Indo-European realm (as Puhvel points out. 1987: 185). Is this a peculiar Irish development, as Puhvel suggests, or is it closer to the original with the other corpora having lost their verve (and nerve)? Since one learns the

language of one's mother, the surest way for a language to spread is to have women who speak it fan out. Perhaps, therefore, the Indo-European expansion, rather than being one of mighty warrior hosts, was one of caravans filled with smart, sexy women who beguiled themselves into the hearts of the neighbouring men.

(5) As to sound laws, comparative mythology offers no analogy except to note certain trends (following Puhvel, for example, reduced sexual activity in Roman myth, 1987: 164, or a pairing of gods (dvandvas) in Vedic, 1987: 47)).

(6) Without laws, deviant developments in myth cannot rise above the level of the unusual, the odd, that which surprises the worker. Rather than permitting the enterprise to rise to that of a science (step 7), such oddities may be explained as rare retentions or simple errors. Borrowings cannot be excluded and in fact myths can cross both language barriers and linguistic family barriers. For example, the Indo-European mythic legacy recorded in the non-Indo-European Circassian, Abkhazian, and Ubykh languages in the form of Nart Sagas is enormous and very rich (Dumézil 1978; Colarusso 2000). It would seem that comparative mythology will remain an art form, though it shows all the signs of becoming a vital and growing art.

(7) With no way to explain deviant forms, conditioning factors cannot emerge as they do in linguistics. At most, upheavals in the history of a people can explain shifts in their mythic traditions by means of specific processes that account unexpected changes in the sense of those myths. Here Dumézil's legacy is particularly rich, with his work on myth that has been epicized (Hindu) (Dumézil 1971a), or historicized (Roman) (Dumézil 1973a), while Puhvel (1987: 94-116) has explained the Zoroastrian corpus as being morally inverted.

(8) Like proto-forms, proto-myths can be assembled, but with the doubts surrounding their prime characters (see (4)). They lack the neat linearity of reconstructed words or phrases.

(9) Like a proto-language, a proto-ideology, expressed in myth and informing

society, can be reconstructed, but the doubts surrounding the reconstruction of specific figures (4) and the myths in which they engaged (8) compound the problems of fleshing out such an historical reconstruction. Here Dumézil's genius was to assemble enough details, coupled with the master plan provided by the Indo-Aryan caste system (and its echo among the Iranians and among the Circassians, Abkhazians, and Ubykhs) to make a firm case for an overarching conceptual world permeating the Indo-European parent community (1968). Through no fault of his, it remains, however, a rough blueprint with a few military, moral, and legal tokens that have survived in various branches.

(10) As to daughter branches themselves, these exist in so far as various myth corpora either show differing association of material or its absence. Material has changed, as phonemes have. It has been reworked and reused, as morphemes have. Still, simple laws of shared "myth grammar" defining these branches cannot be posited, short of the processes of historicization, epicization, and moral inversion, and these themselves are not fully understood.

(11) Stages between a vague mother ideology and its proto-myths and the attested mythic corpora can be traced out, but again these lack the coherence of their grammatical analogs. For example,(following Puhvel once again, 1987: 117-125), the Shah Nama of medieval Iran shows certain ancient Indo-European themes, such as the monster slaying hero, which have undergone an Islamic moral inversion from their Zoroastrian ancestors, just as these have undergone a moral inversion from a Vedic-like Iranian prototype, preserved in an epicized form in the Nart Sagas of the North Caucasus (as Dumézil showed, 1978).

So, the efforts to reconstruct myth differ in many details from their correlates in historical linguistics, from which they take their inspiration. Nevertheless, progress in Indo-European historical mythology has been dramatic. Clearly some one must be doing something right! It is at this point that the matter of details, those details over which Dumézil had such masterful control become crucial.   I return to the first point in

my discussion of language.

When a linguist compares the word for 'foot', for example, in two languages, say Old English fōtu and Ancient Greek pódos (genitive), the fact that the two have words for such a concept is not particularly compelling, since all languages have a word for this bit of anatomy, the equivalent of 'foot' or of 'end of the leg'. It is crucial, rather, that the words have similar shape: they begin in a labial sound in each; the next vowel is rounded, mid, back; the next consonant is a dental stop, etc. These coincidences are in the languages' two words because they were memorized by language learners over millennia and hearken back to a common origin. The process of comparison is amenable to a simple probabilistic model.

Let us take the starting point (the rolled dice, so to speak), as the Greek word, pódos. Assume this to be a given. (Otherwise then if we suspect the Old English word to be a cognate, we must ask what are the chances of it having a shape comparable purely by coincidence alone to the Greek word. Specifically, what are its chances of beginning with the consonant we suspect to be the correspondence to Greek /p/? Since Old English had 20 consonants, the probability of the first one being /f/ are 1/20 or 0.050. With 12 vowels (6 timbres and [± long]), the probability for a corresponding vowel is 1/12 or 0.083. The probability for the /t/ is also 1/20 or 0.050. For the second vowel, things go awry, so we will stop at the root, /f ōt-/. The probability of a string of independent events is the product of their individual probabilities (Applebaum 1996: 49 ff; Hubey 1999): (0.050) x (0.083) x (0.050) = 0.0002075, or odds of 5,000 to 1 (2.075 divided by 10,000 or roughly 1 divided by 5,000).

This may seem small, but such probabilities are at work within a language and over the stretch of a normal vocabulary will account for a sizable number of chance matches between two languages, much as a grade school class of twenty-five or more students is likely to contain two pupils with the same birthday. For a second comparison, we can calculate a probability for a match when we have chosen two words from one language

(again, the dice have been rolled) and seek two from another language that are alike, in both form and sense, in the same way. When we ask what would be the probability of the two matchings as a whole (or a string, if you will) being alike by sheer chance (or matching precisely in terms of suspected sound laws, say /p/ in one with /f/ in the other) , we must multiply the total two probabilities of the two matchings.   Since both are independent "events" this would be,(following the preceding example of words three phonemes in length), the square of (0.0002075), which is comparable to (0.0002) x (0.0002) = 0.00000004, (4×10^{-8}), which yields odds of 25 million to one that such a coincidence would be "ahistorical." Since no language has a vocabulary of such size, these odds imply that when two such matches occur between languages there is little reason to assume that they are due to mere chance. Chance may be still possible, but it is highly unlikely. If borrowing is impossible, then the two languages have an extremely high probability of being sisters. The early stages of comparison require more evidence than just two similar pairs only because the actual matches are usually only approximate.

What began Indo-European studies, however, was the observation by Sir William Jones that entire paradigms from Sanskrit matched paradigms within Latin and Greek (Mallory 1989: 11-12). It seems that the chances of paradigms matching is so low that they offer overwhelming proof of genetic relationship. This effect could simply be viewed mathematically as comparing super long words that consisted of all the forms within a paradigm. In fact, however, whole paradigms almost never match perfectly between two languages. Yet, if even one word in a paradigm matches that of another in a different language, then the evidence for genetic links is considered compelling. To see how this is so, let us label one language as L_1 and the other as L_2. Suppose these both have paradigms of singular and plural, first, second, and third person present indicative verbs. Does this alone tell us anything mathematically? The answer depends upon the frequency with which such paradigms are found in the world, or perhaps

more pertinently, in the linguistic areas of L_1 and L_2. Such systems are quite common across the Indo-European area, so let us assume that the probability of having such a paradigm is nearly one or certainty for each language. Let us further assume that the occurrence of these paradigms is independent, so that the relevant probabilities yield: $P(L_1) \times P(L_2) \approx 1 \times 1 = 1$. So, just having such a paradigm tells us nothing. If, however, L_2 has a morpheme in such a paradigm that coincides with or closely resembles one in a paradigm of L_1, both in phonology and semantics, then the probability is that of finding such segments (number of segments divided by the number of segments used in inflections, as with previous calculations) and finding them with that sense, that is, finding them on a particular branch of the paradigm. Since the paradigm is defined as having six branches, this is $1/6 = 0.1666...$ The number of segments used in inflection is always lower than the number of segments in the language as a whole, but presumably this probability is low, comparable to what was calculated in the example of 'foot'. So, having a coincidence between two languages that falls within a paradigm immediately makes this even less likely as due to chance than just finding such a coincidence between isolated words. There is another implication here, however, that is extremely important. If L_2 has only one form from a paradigm, P_2, that coincides with a form from P_1 within L_1, then either P_1 or P_2 can be assumed to have been reworked and both can assume to have come from an original paradigm. This assumption is true even if both paradigms have undergone substantial reworking so that the original is no longer entirely retrievable. In effect whole systems are being compared and if the probability of one of their parts coinciding is small, then the two systems must reflect an earlier unity. An example will be helpful here.

Modern Irish has a paradigm that has undergone major reworking from Old Irish,(knowledge of which I shall suppress for the moment). I give it in (1).

(1) Modern Irish present indicative paradigm of 'to bear' (Lockwood 1972: 90)

person	singular	plural
1	beirim	beirimid
2	beireann tú	beireann sibh
3	beireann sé/sí	beireann siad

The second and third persons are synthetic, and the only reason for placing them within a paradigm is a semantic one. The first person forms, however, show an ending /-im/, with the plural perhaps having an enlargement with /-id/ (? from an old collective). If this is compared with distant Sanskrit, distant both in time and space, shown in (2), then this "deviance" within Modern Irish shows a striking coincidence with the Sanskrit first person forms.

(2) Sanskrit present indicative paradigm of 'to bear' (Lockwood 1972: 216)

person	singular	plural	dual
1	bhára–mi	bhára–mas	bhára–vas
2	bhárasi	bháratha	bhárathas
3	bhárati	bháranti	bháratas

(Noteworthy is the inclusion of three dual number slots, which are quite rare among languages. If the coincidence with Irish had fallen there, then the probability for this part of the paradigm would no longer have been near certainty, but would have in itself have been quite small, and therefore would have been seen as highly significant.) In light of Sanskrit the Irish ending /-im/ appears to have a cognate in Sanskrit /-a–mi/, and the Irish first person plural, /-imid/, appears to have been enlarged by /-id/, a conclusion suggested from within Irish itself. A rough calculation of this matching being totally due to chance would run as follows (these are "conditional probabilities," for which see Applebaum, pp. 43-45):

(3) Probability for the matching between Modern Irish and Sanskrit

    (a) probability of both having the paradigm

        $P(\text{Irish}) \times P(\text{Sanskrit}) \approx 1 \times 1 = 1$

    (b) probability of both languages having /-Vm/ in this slot

        Irish: $P(V) \times P(m) = (5 \text{ vowels}/ 26 \text{ segments}) \times (1/20 \text{ consonants})$

                $= 0.19 \times 0.05 = 0.095 \approx 0.10$

        Sanskrit: $P(V) \times P(m) = (8 \text{ vowels}/36 \text{ segments}) \times (1/28 \text{ consonants})$

                $= 0.222\ldots \times 0.0357 \approx 0.0079$

    (c) probability of having this sense

        Irish: $1/6 = 0.1666\ldots$

        Sanskrit: $1/9 = 0.111\ldots$

    (d) probability of random matching between the two

        $1 \times 0.01 \times 0.0079 \times 0.1667 \times 0.111 = 0.00000146 \approx 1.5 \times 10^{-6}$

In terms of odds this is nearly 2,000,000 to 3! Cognacy is assured and in fact is attested by turning to the Old Irish verbal noun shown in (4) (Lockwood 1972: 87)

(4) Old Irish verbal noun

person	singular	plural
1	biru	bermi
2	biri	berthe
3	berid	berit

The first person singular suggests that both Modern Irish and Sanskrit, nearly 2,000 years before, generalized an /-m-/ from the first person plural. This is confirmed by

comparison with the paradigms of Greek (5) and Gothic (6).

(5) Greek present indicative paradigm of 'to bear' (Lockwood 1972: 14)

person	singular	plural	dual
1	phéro–	phéromen	--
2	phéreis	phérete	phéreton
3	phérei	phérousi	phéreton

(6) Gothic present indicative paradigm of 'to bear' (Lockwood 1972: 129)

person	singular	plural	dual
1	baira	bairam	bairos
2	bairis	bairió	bairats
3	bairió	bairand	---

Thus, paradigmatic parallels add extra weight to the comparative argument very quickly, virtually assuring the investigator that the languages in question are cognate. When several points within a paradigm can be compared with correlates in another language, as when comparing Old Irish to Sanskrit, Greek or Gothic, then the probabilities become exceedingly small because the calculation done in (3) involves "mega-words," strings of several forms on several semantic branches. This sort of effect might be called "paradigmatic pressure." This technique of paradigm matching can be extended and applied among the details within a single paradigm when it is compared to cognate paradigms, so that original matches, such as the /-m-/ of the first person plural, can be determined and their spread elsewhere within the paradigm can be demonstrated by their failure to match at this point. This can be done because all the

paradigms under consideration are assumed to be cognate as systems, large scale "objects" that must match as wholes. Such "paradigmatic shuffling" will eventually bring the investigator close to the original paradigm. Therefore, such probabilistic arguments can be used to recover grammatical systems and not just cognate words.

We can now stand the probability argument on its head and ask what such presumed coincidences tell us in terms of information. Since information is measured by (defined as) the logarithm to the base two (to match the on-off states of a computer's circuits). Here I have used the formula $I = -\log_2(P)$, (where 'I' is "information"). I calculated the base ten logarithmic value of the probability and then multiplied it by 3.322, ,(since $\log_2 10 = 3.3219$ (roughly 3.322) and $n = 10^{\log(n)} = (2^{\log_2 10})^{\log(n)} = 2^{\log_2 10 \times \log(n)}$) (Applebaum, pp. 93 ff, especially equation (6.1)). The negative sign in the formula makes the measure positive, since the log of a fraction is always itself negative. This measure of information is termed a "bit." We can now see that such tiny probabilities are delivering significant quantities of information to us: $-\log_2(0.0002) = 12.3$ bits, $-\log_2(0.00000002) = 28.9$ bits, $-\log_2(0.00000146) = 19.6$ bits. We can interpret such information quite simply: the languages are related and the words in question are cognates.

When we attempt the same argument for myth, we find that we lack the equivalent of simple phonemic inventories on which to base probabilistic calculations. But, we can turn the argument on its head. Since we are following a paradigm (linguistics) where probability yields explanatory results, we can now say, thanks to such work as that by Dumézil, that when we are sure we are dealing with cognate or comparand myths, we must in fact be facing a limited range of possibilities into which myth can transform, that themes and figures may be lost, but they cannot transform indefinitely. Probability is at work in myth comparison as it is in language even though we cannot operationally measure it. When the odds get too high, then information theory's logarithmic equation tells us the myths are related.

The reason the probability model works (and why comparative mythology yields results) is because language and myth share a crucial feature in their transmission: both are memorized (language in the sense of a language acquisition faculty, myth in the sense of a bard memorizing the work of earlier bards); both are subject to errors in transmission. The result in myth is that detail, particularly detail that cannot be motivated by plot line or by aesthetic needs,(as in language the use of a labial phoneme at the beginning of the word for 'foot'), exists in the myth precisely because it is old. Its probability of being in the work in such a case is virtually nil and its consequent information load is extremely high. With mathematical certitude it is telling us that the myth is a comparand, even perhaps a cognate, of a myth elsewhere which contains a similar detail, although in the other myth such a detail may be part of a harmonious and well motivated plot or character. The value of such isolated detail is complemented by other odd details that have comparands as well. While the distinction between paradigmatic structure and phonemic form is absent in myth, assembling an array of such details serves a similar function in my mathematical model: the probability of sheer chance occurrence decreases to the minuscule, and the net result is to vastly increase the mathematical certitude of common origin.

This is why Dumézil's work with detail is such a vital part of his legacy. His grand scheme of tri-functional Indo-European society can be doubted in so far as it draws its evidence from the functional, and still extant, caste system of India, where its aspects may have been reworked from their Indo-European origins to suit local social needs, even at an ancient time. But, of course, he did not base his theory on India alone. He found odd details pointing to such a system in a host of Indo-European traditions, odd details that often appeared in the least expected places within those traditions: the images on a shield, the blunders of a young warrior, the colours used in a horse race. It is the details that assure us not only of small themes that Dumézil posited, but of his great overarching one as well.

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