PROBLEMS OF HINDI TERMINOLOGY

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Introduction

THE PROBLEMS OF HINDI TERMINOLOGY ARE MANY AND varied. Any attempt to study them in isolation without reference to dispositions and patterns of English terminology, from which Hindi has inherited much, or without describing implications of the language of science as such, would deepen existing prejudices instead of dispelling them. Modern linguisticians for the major part of their pursuit keep semantics in a suspended animation. But in the context of my subject of study, I have to take into consideration both form and meaning simultaneously and treat language as a physio-psychic entity, which reveals an evident teleology in its multifarious function. Man, as member of a community, establishes certain correspondences between speech-form and meaning which we reckon as language behavior. In subsequent stages of history and cultural development, morphemes and sememes establish highly developed S-R Bonds[1] for purposes of communication and comprehension.[2] In higher reaches of abstraction, *i.e.*, when a symbology is employed, even a single grapheme develops invariant correspondence with a sememe; otherwise how could algebra be possible? How could there an equation like $e = mc^2$?

Another fact that requires mention is, the genetic mutuality between "signifiant and "signifie." It is inherent, as though in the organismic entity of languages.[3] This creates inertia of correspondence which is disturbed by the scientific approach to things. The "current concepts" are consequently re-organized into constructs" and not only the "signifie" is modified but quite often the "signifiant" is also modified or replaced by another "signifiant," *e.g.*:

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[1] Cf. Thorndike's theory on "Conditioned Reflexes."

[2] Vide, Joshua Whatmough, *Language: A Modern Synthesis*, Secker and Warburg, London, 1956 p. 252: "However systematic in form and symbolism, in usage linguistic systematization is strongest in specialized languages — logic or mathematics, or the exact sciences like Chemistry and Physics."

[3] *Śabdaḥ kāraṇam arthasya sahitenopapadyate, tathā ca buddhiviśadarthāc-chabdaḥ prathyate.* — *Vākyapadīya, Bartṛhari.* "The word (language) which is the cause of the meaning emerges by being combined, and thus from the meaning of the intellect cause the word (language) results."

	WORDS	MEANINGS	
Literature	Speed, swiftness, rapidity, velocity	Unspecified change in position	Semantic *inertia* Ordinary lexical meanings
Science (Terms)	1. Velocity	Rate of change of position of a body in a particular direction	Semantic *modification* Constructs
	2. Speed	Rate of change of position along its path in whatever direction	

	WORDS	MEANINGS	
Science (Terms)	Capacity	Power or ability to hold, receive, ability to contain, ability to absorb, etc.	Semantic *inertia* Ordinary lexical meanings.
	1. Capacity	Different definitions	
	2. Capacitance	The quantity of electricity that a battery can deliver under specified conditions	Semantic *modification* Constructs

This scientific orientation of meanings, therefore, assumes supreme importance, and various considerations of form and construction which are sought after for aesthetic excellence in literature are relegated to a subordinate position. Linguistic scrutiny of any specialized language with its terminology, therefore, would not commence at the speech-end,[4] because it will not carry the investigator very far. He has to deal with meanings first and then perceive and analyze the pattern of form, which would at the very first glance appear to be strange and mechanical yet carefully and systematically built up. Strangeness lies at both ends.

[4] For better appreciation of the role of modern linguistics and the deficiencies of its theory and practices in respect of the developing national languages of eastern countries, please refer to a monograph entitled "The Failure of Modern Linguistics in the face of Linguistic Problems of the twentieth century" by Dr. S. Takdir Alisjahbana, Professor of Malay Studies, University of Malaya, Kuala Lumpur.

To begin at the semantic end, we find that the advent of science radically changed our way of looking at things. There was unprecedented accent on objective thinking. Man's concepts were subjected to critical re-organization in terms of sensory perception. The literary aesthetics which sustained fluidity of meanings of words was considered detrimental to the growth of science. Metaphor was the first casualty. Instead, "one meaning, one word" was posited as the guiding principle. The situation has been aptly described by Joshna Whatmough: "The fundamental problem is to adapt language, which has been outstripped by physics to the needs of science, to the needs of constructs, for which the linguistic symbolism is now totally inadequate. Huxley could and did define science as organized common sense; now much of it begins to look like uncommon nonsense, which admits no correlates between its constructs and the so-called 'primary' data of sense impressions. Hence the scientists are called upon to wrestle with problems of language as well as of their own sciences. It is not at all like the linguistic problems of the poet or novelist; but much more like that of a solver of a many-dimensional cross-word puzzle — and words may be tried but only one will fit all parts in all directions." It has been through such a selective-inventive process that terms have accumulated during the course of several centuries, which makes it difficult to resist the temptation of designating language with profusion of such constructs as the "physical thing language."[5]

In respect of form, study of morphemes of this "physical thing language" reveals strangeness in different aspects. A linguist can easily identify in it the presence of morphemes of different historical and cultural milieus. It possesses a highly developed built-in mechanism of term-construction; grammars of different classical languages have been uninhibitedly exploited. Thus it is not only hybrid but also highly mechanized. English terminology bears abundant evidence of these facts, The worst of it is, it also presents a dismal picture of determinism since in the course of hectic function in the fields of science and technology it has helplessly succumbed to the massive strength of classical languages, namely, Latin and Greek from which it had been restlessly trying to escape. Hindi terminology having entered subsequently in the field has shared the same features; besides it has also faced certain indigenous difficulties.

Hindi Technical Terms

Technical terminology in Hindi which evolved during the course of the past 120 years, is an exciting phenomenon to deal with. The whole corpus of terms comprises a number of sets fairly distinguishable by their

[5] G. Mandier and Wkessen, *The Languages of Psychology*, pp. 43-44.

framework, complexion or stylistic identity. But they have one thing in common. They are in a very large measure translations of scientific and technical terms obtaining in English technical glossaries, lexicons, and books. They are mostly morphemic correspondences of Western terms. They have not, as a matter of course, been built as normal constituents of a continuous scientific and technical discourse either translated or originally written; they are corresponding lexical items of parallel anatomy and presumed semantic invariance. Their meanings have bilateral dependence. They draw sustenance from the model, the referent on the one hand and specialist group's consensus on the other. But this has not been the exclusive *fait accompli* of Hindi. All national languages of the developing countries have shared this inevitability.

In this paper I have to limit my observations to a few basic concepts of the physical sciences which would amply illustrate major problems of Hindi terminology. Hindi words denoting individual physical phenomena have a perplexing plurality. Even a simple thing like water has been designated *pānī, jala, nīra, vārī, apa, amba salila,* etc. The earlier historically recognized Hindi prose, mostly having been written as literary essay, has used these words according to the need of the situation as well as style. However, narrative technical prose in the initial years of the twentieth century narrowed down the choice to *pānī,* and *jala* (*pānī*) has certain idiomatic and figurative uses whereas *jala* has none. But the fact still remains that in India, and maybe in other Oriental countries also, certain ancient sciences dealing with physical objects have employed a host of figurative terms within the same discourse without perceptible confusion. These sciences flourished immensely, for example, astrology, (*gaṇita-jyotiṣa*) or Indian medicine (*āyurveda — caraka suśruta*).

How precisely defined meaning transcended the multiplicity of terms and maintained its invariability among different scholars is very intriguing. Perhaps multiple conditioning of a single-response is possible in the case of the human mind; perhaps, the Oriental practice of embodying science in verse which gave more accent to the "inward eye" rather than the visual sense organ may be able to account for it. But this phenomenon does prove one very vital point that science (its content) if properly and deeply assimilated can tolerate variant verbal symbolization within a subject setting, until it is reduced to mathematics. I cannot dilate on this point here, because I would be guilty of digression to the mechanism of human understanding, the psychology of semantics. The "physical-thing-language" in this situation can be none else than one which symbolizes the phenomena of nature in terms of structure, functions, properties, etc. from many angles. In fact, such synonyms comprise different perceptual constituents of individual concepts,

e.g., mercury — *pārada pāra*: *rasadhātu* (classification), *mahārasa* (chemical function), *capala* (behaviour). Plurality of terms is no longer considered as conducive to scientific studies, since it not only confounds but also mixes up the sensory data requiring severalized treatment. Hindi has been struggling hard to adopt the "one word-one concept" principle.

However, there is another alarming feature which calls for serious consideration. In its urgency for modernization, Hindi not only transplanted scientific constructs, it was a *sine qua non* structural (prefabricated) pattern also. The concepts as embodied in foreign words mostly present themselves to our scientists as different assemblies of semantic units in the manner permitted by the morphemic structure of the English language (this includes word-formation techniques borrowed by English from classical, other European and Arabic sources), *e.g*,

Air-conditioned — vātānukūlita

low-visibility — alpadṛśyatā

a	syn	chron.	ous
con	tempor		ary

a	tulya	kāla	ika
sama	samaya		ika

This feature is deterministic in import. Scientists and linguists in India, it appears, cannot disentangle themselves from the definitions of scientific concepts obtaining in English. Perhaps there is no escaping it. One cannot orient the "constructs" without losing conformity with the way that particular branch has looked at physical reality. The shift from "light" to "visibility" is a shift from physics to aeronautics, necessitating two separate words in subsequent languages of science on the pattern of English terms.

Choice of Hindi Words

The first problem for consideration is the choice of a particular so-called "physical-thing-word" of Hindi from amongst many synonyms. Of course, a commonsense criterion would be, how readily and substantially does a word excite the required scientific concept in the minds of those who employ it. But in certain prolific languages like Hindi, two or three synonyms have now been employed in science literature and do not pose any serious problems, as they have remained isolated and their usage has been fairly restricted. But when viewed educationally, use of different synonyms in teaching later on turns out to be quite detrimental to instruction in science. The primary criterion in

selection of lexical items in a multiple choice situation, therefore, has to be their educational efficacy. "Basic concepts of science," writes Dr. Kothari,[6] "often have their root in primitive experience. One's initiation into science would not be natural and the grasp and understanding would suffer in vitality and breadth if one used one term to describe a concept inside the science class-room and another term for it outside the class-room." The whole problem thus boils down to the question of the medium of education.

This observation of a renowned Indian scientist and educator hints at a distressing realization that science education in India through the medium of the English language (for about a century) has not been able to accelerate the process of social and cultural change among the Indian masses. Science is no longer treated as a tool for conquest of nature. It is progressively reorganizing human thought, attitudes, and social and individual responses to a given situation.. This idea has already been explained above, by referring to associational inertia between words and age-old meanings and how science has interfered with the re-orienting of associational bonds in the light of new aproaches. Deep permeation of science into the depths of India's personality would never materialize, unless new meanings give a jolt to the old ones through the symbolism employed by the people and the language of the community outside the class-room is brought into the class-room.

Most scientists and science teachers in India find it inconvenient to accept this glaring truth.

Educational validity principle applied to language in the wider context of present-day knowledge presupposes a larger community outside the class-room. The mother tongue idea, therefore, presents a dilemma: whether to choose the mother tongue (which obviously proves inadequate after the elementary stage of knowledge acquisition) or the standard language which is sufficiently developed. Which mother tongue? The tongue of the biological mother or the tongue of a foster mother employed and enriched by the larger community group? I somehow feel that the principle "Teach through the mother tongue" calls for a definition of the term "mother tongue" in education. A language which supplies terms for basic scientific concepts must not desert the scientist in further word formation.

Dependence on Classical Language

The reason why British and American scientists have reclined heavily on classical vocabulary and grammar was that terms like "water" did

[6] In *The Problem of Scientific and Technical Terminology in Indian Languages.* Commission for Scientific and Technical Terminology, Ministry of Education, Government of India.

not go quite palatably, elegantly, and prolifically. From it they could have coined "waterate," "waterant," "waterulic," "wateroid," and "water-electric." But firstly, originators of the different concepts of science were not all British or American; secondly, they took into consideration intelligibility of the terms for a larger community of scientists. They did not find the analytical nature of modern languages suitable for highly compressed complex concepts. The large possibility of associational deviations inhibited them from accepting words and stems from the language of literary and common parlance; on the contrary, they found the inherent mechanics of classical grammar unstrenuously operative and immensely productive.

Thus, the syntactical base of modern languages which are stuffed with a large number of classical terms and expressions, is what appears as the language of science today .

In this situation the language of a larger community with a rich and varied literature and greater promise of word multiplication to the extent of recording and naming a large number of semantic values, should be recognized as the educational mother tongue. Hindi not Avadhi or Bundeli could be used for the forward-looking, varied education of Indian children.

Dialects have their own limitations. It is not that they are incapable of developing or borrowing, but they have not risen beyond personal discourse and possess no scientific and modern literature to begin with. The technical terms derived from dialectal roots appear incompatible with the dominant texture of terms used traditionally in cultural and philosophical fields. To illustrate this point, we might coin:

hydrated —	pānayāyā	hydrant —	panaromṭi
hydraulic —	panacaliyala	hydroid —	panaśakla
hydro-electric —	panavijaliyāṃ		

In contrast to these we find that the dialects employ Sanskrit words like karama (karma), mokṣa, dvaita, bhagati (bhakti), nyāya and a host of similar terms in non-physical discourse.

Secondly, the dialects use very few prefixes. Vada, su, and vina are some of the few. This tendency necessitates the use of separate adjectives, eliminating occasion for compounding and resultant compactness. Hence, the criteria of currency and intelligibility have to be applied in a forward-looking manner.

Hindi terms for basic concepts of science had to be drawn from such a stock as was capable of prefixation, suffixation, and compounding. The choice quite often fell on loan roots and words of Sanskrit which not only supplied words and word-formation techniques to Hindi but to other Indian languages also.

A sincere attempt to create a simple terminology with Hindustani words, stems, prefixes, and suffixes was made in the early '40's by Osmania University of Hyderabad, *e.g.*, acceleration — cāla-baḍāvā, reaction — palaṭakārī, atomize — aṇuyāṇā, etc.[7] But it confined the enterprise of this character to a few social sciences only. The experiment did not succeed and had to be abandoned.

It quite often pains me to find that very few scientists in India hurl their wrath on classicism and obscurantism of a large portion of English terminology, although most of them deplore new coinages in Hindi at the slightest opportunity, branding them as jaw-breakers and tongue-twisters. It is not suggested here that simple and current words which can answer the needs of science be replaced by Sanskrit words. But from the study of existing Hindi terms, its observed and connected term-formations, Sanskrit has come to its rescue as a highly efficient source language in the manner Greek and Latin have done to strengthen English scientific terminology.

Problems of Selection of Terms from Classical Source

However, the use of essentially Sanskrit vocabulary with *tatsama* or *tadbhava* forms has posed new problems. The same concept of science has been embodied by different terminologists in different synonyms. The causes are not far to seek. As we all know, language is developed by its wide-spread use. Hindi and the other languages of India could not establish themselves on firmer grounds as the media of science education. Consequently, literature on scientific subjects has been produced in negligible quantity. Book production has also suffered for want of organized evolution of terminology.

Thus, writing on science subjects gradually subordinated itself to coining of scientific and technical terms. Term-coinage was carried on in abstraction and each scholar began to evolve his terminology with the help of a few asociates. Obviously, the choice of words was varied and each word was semanticized in a subjective manner to function as a scientific term. Some examples are the following:

acceleration —	tvaraṇa, tīvṇa, tīvkaraṇa
probability —	saṃbhāvanā, saṃbhāvitā, prāyikatā
energy —	śakti, ūrjā
velocity —	vena, gati
force —	bala sāmadhye, śakti

The use of prefixes and suffixes also produced similar results. Sanskrit prefixes are notorious for generating plural meaning in the roots,

[7] Topa, *Hindi Terms of Sociology*. Osmania University, Hyderabad.

and homonymous bound forms can be rationally justified in the case of each meaning.[8]

Efforts of Standardization by the Government of India

The scientific method used to solve this difficulty is to list concepts, then to prepare their definitions in the language concerned, which ultimately determines the choice of terms from among the competing words.[9] The West until recently did not feel the necessity of this academic exercise. For the East it was a desperate battle against time and a very expensive and dilatory luxury.

The government of India, obviously, could not start *de novo* by categorizing concepts. It, however, started with definitions. The scientists and linguists were brought round a table. Definitions were discussed and formulated in Hindi and a term was fixed by consensus. This method was a definite improvement on the previous predominantly etymological and intuitive ones. The Hindi terms which thus emerged were:

Force — bala
Energy — ūrjā
Heat — ūṣṇā
Power — śakti
Work — kārya
Temperature — tāpa

Problems of Individual Sciences & Lexical Borrowing

In dealing with individual subjects one finds that physics is typically rich in concepts such as those cited above, while chemistry requires a large number of names for objects. Ancient Sanskrit sources give us names for only 7 to 8 elements while Hindi terms were required for more than 100. Scholars like Dr. Raghuvira, inspired by the classicism of English terminology and even extending it to common ideas and concepts, hastened to give Sanskrit equivalents for all terms.

I would like to mention here that the Sanskrit language has not been that conservative. It adopted new concepts with their new (foreign) significations which are now normally hard to identify as such. Dr. S.K. Chatterjee and T. Burrow, among others, have thrown abundant

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[8] Examples: condensation saṃghanana, parighanana; reaction abhikriyā, anukriyā; spread prasāra, prasṛti

[9] *Naming principles*, ISO-TC/37 UNESCO

light on lexical borrowings of Sanskrit from Dravidian and other sources. There is evidence of loan words from Eastern sources also, *e.g.*, kaimd, haura, drakma, etc.

But when the modern sciences came into the picture substantial lexical borrowing was in the offing, and scholars like Dr. Raghuvira predicted the large-scale alienation of the Indian vocabulary and prompted him to demonstrate the might of Sanskrit. He created the following equivalents —

Carbon —	prāgāṃra	Borax —	tāṃkaṇa
Oxygen —	jāraka	Argon —	mandāti, etc.

Etymologies of these new names were also explained at length.

Scientists, however, did not agree with Dr. Raghuvira. Firstly, they felt that, for Indians, coined Sanskrit names by such etymological method were as unfamiliar and ambiguous as their Western originals. Secondly, acceptance of Sanskrit nomenclature of this kind would necessitate a new set of symbology, jeopardizing the assiduously acquired and speedily growing knowledge. It was, therefore, in the interest of the advancement of science in India to keep some essential beneficial link with the international sphere of science.

Adoption and Adaptation of Loan-Words

Indian sicentists preferred transliteration of such names into Devanagari script with standardized spellings. Thus was laid down another radical principle of adoption and of adaptation which permitted foreign stems to form new words with Sanskrit or Hindi prefixes and suffixes. Hybridization in scientific terminology was not considered unethical and was prescribed as one of the valid modes of term coinage. Examples of words formed with alien roots (nominal verbs) are akābainika (inorganic), āksīkṛta (oxidized), aghika (defelisic).

This dormant feature of language growth has made a large-scale reappearance in the wake of science and technology in developing countries. It was resisted and tabooed by purists and literary men but people in general are getting used to it.

This should not be construed to mean that the whole scientific vocabulary can be imported. Some scholars in India would not hesitate to do so for what they consider "academic" reasons. One of their kind made such a fanciful suggestion in the sixties of the 19th century.[10] But Dr. Rajendra Lal Mitra gave a forceful rejoinder to it,[11] which is echoed

[10] Translation of Greys by Ganga Prasad Mukherjee.

[11] "A scheme for rendering of European scientific terms into vernaculars of India."

in the monograph on this subject by Dr. Kothari: "To put crudely this simple but exceedingly important point: Science fixes the meaning of a term, language, fixes the word. It is in this sense that we speak of a common or universal language of Science in a multilingual world. The meaning of a scientific term belongs to science, but the word representing the term belongs to language and is subject to its rules of grammar and syntax: The meaning is universal, the word is local or regional.

It is in general not practical to implant words describing 'concepts' from one language into an essentially different language. One word leads to several associated words and to import the whole lot would almost amount to replacing one language by another."[12]

The extent of adoption of foreign terms has been restricted by Indian scientists by specifying and delimiting the content of what is known as the "International Terminology." One of the principles approved by CSTT[13] reads:

(a) Names of elements and compounds, *e.g.*, hydrogen, carbon, carbon dioxide, etc.,
(b) Units of weights, measures, and physical quantities, *e.g.*, dyne, calorie, ampere, etc.
(c) Terms based on proper names, *e.g.*, Fahrenheit scale (Fahrenheit), Voltmeter (Volta), Ampere (Ampere), etc.
(d) Binomial nomenclature in such sciences as botany, zoology, geology, etc.,
(e) Constants, *e.g.*, n, g, etc.,
(f) Words like radio, petrol, radar, electron, proton, neutron, etc., which have gained practically worldwide usage.
(g) Numerals, symbols, signs and formulae used in mathematics, and other sciences, *e.g.*, sin, cos, tan, log, etc. (letters used in mathematical operation should be in Roman or Greek alphabets).

Thus, the new Hindi terminology has on the one hand fallen in line with other developing languages of the world and on the other it has presented new challenges to academicians and linguists of India, who have never before envisaged linguistic exercise of such a magnitude and intricacy. We cannot just dismiss the evolution of Hindi terminology as a prescriptive phenomenon. Incidence of "interference" has always been treated as a historically recognized agent of language growth. In the process of their development, languages have not only been naturalizing and assimilating foreign features in their corpus but also organizing and reorganizing their resources to face new situations and achieve new goals.

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[12] *The Problem of Scientific & Technical Terminology in Indian Languages.*
[13] Commission for Scientific and Technical Terminology, Ministry of Education, Government of India.

Conclusion

The problems of Hindi terminology with limited reference to the basic concepts of science have been discussed in this paper briefly in a general way. Each aspect requires a separate and detailed examination. However, what demands our urgent attention is the criterion of scientific and technical literature in Hindi through a crash programme. Ratification of meanings conceived of by Indian scientists and embodied by linguists in Hindi lists of terms can be achieved only in a contextual setting. A beginning has already been made but the programme does not seem to have gained requisite momentum. It is in this situation of pathological complacency and inertia that a socio-political decision is imperative for real and substantial scientific re-orientation of the Indian people.