

Block 2

Translation of Knowledge Text

Unit 5

Translation of Literature relating to Humanities

Unit 6

Translation of Literature relating to Social Sciences

Unit 7

Literatures of Science-Technology : Meaning and Dimensions

Unit 8

Literatures of Science-Technology and Translation

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Introduction to Block 2

This second Block of the course presented on ‘Areas of Translation’ is related to the ‘**Translation of knowledge Text**’. Although knowledge can be classified into many branches and sub-branches, but in the present Block, we have included only units based on the literature of its major branches. These are - Humanities, Social Sciences; and Science-Technology literature.

There are total four units in this Block.

Unit-5 ‘**Translation of Literature relating to Humanities**’ discusses the importance and characteristics of humanities literature and also explains the nature of this literature. In this context, the entire literature is classified as literary and non-literary subjects. The non-literary subjects are further divided into science and non-science subject sections. Humanities belong to this non-scientific category. While considering the nature of Humanities literature, it has been clarified that under it the subjects of philological Humanities like languages, linguistics and criticism are included and in the contemplative Humanities subjects like philosophy, religion, logic and psychology are included. It would be appropriate to indicate here that Psychology can also be said to be a subject between Humanities subject of thought and thinking, because along with thought or information, elements like thinking, feeling are also present in more or less proportion. Although there may be differences or debates in this division/sub-division, but we have accepted this classification for the convenience of the students. The Unit outlines this classification as well as the prerequisites for translation of Humanities literature and its difference from translation of creative literature. Similarly, the semantic and stylistic problems of translation of Philological Humanities literature on languages and linguistics are also discussed here. At the end of the Unit aspects such as the form and context of translation of Humanities literature based on Philosophy and Psychology have also been discussed.

Unit-6 ‘**Translation of Literature relating to Social Sciences**’ discusses the nature, scope and language of Social Sciences literature. Also, the difference between Natural Science and Social sciences has been explained. In addition, the antecedents to translation of Social Science literature and its difference from translation of Creative Literature have also been made the basis of discussion in the Unit. The challenges of translating this literature are discussed at the end of the unit with illustrative examples.

Units 7 and 8 deal with translation of science and technology literature. Of these, in Unit-7 ‘**Literatures of Science-Technology : Meaning and Dimensions**’, the concept and dimensions of science and technology literature, its writing form, type and features of its languages have been explained. Apart from this, along with the status and necessity of technical terminology in science and technology literature, its historical perspective has also been brought out in this Unit.

In Unit 8 ‘**Literatures of Science-Technology and Translation**’, the need and importance of translation of science and technology literature has been underlined. Along with this, the steps in the process of translation of science-technology literature have been explained in this Unit and the challenges of translation of this literature have also been discussed with examples.

Unit 5 Translation of Literature relating to Humanities

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5.0 Objectives

After reading this unit you should be able to:

- acquaintance with of the meaning and nature of literature relating to Humanities;
- learn about the nature and form of translation of literature relating to Humanities;
- understand the difference between translation of Humanities literature and Creative literature;
- aware of various aspects of translation of Philological relating to Humanities; and
- gain knowledge about the various dimensions of translation of contemplative literature relating to Humanities.

5.1 Introduction

This offered Course is related to different areas of translation. In the previous block of this course, you have studied about the administrative translation, which included translation of literature relating to administration and parliament.

In the second block of this Course, you are now going to study the translation of the literature of knowledge and science. Under this, first of all, you will get detailed information about the translation of Humanities related literature. After going through this Unit, you will be able to understand what is the meaning and nature of Humanities literature; and what is the nature and form of translation of literature related to it. Along with this you will also know the

difference between Humanities literature and Creative literature. In this unit we will discuss only the context of translation of literature on languages, linguistics, philosophy and psychology in Humanities subjects. What are the problems faced by the translator while translating the literature related to these subjects and how can he solve them, it will also be considered.

5.2 Literature relating to Humanities : Meaning, Definition and Nature

In the context of considering the translation of Humanities literature, the first question that arises is what is the meaning of 'Humanities'? Let us first consider its meaning and definition.

5.2.1 Humanities : Meaning and Definition

The word 'Humanities' is derived from a Latin word 'Humanus', which mean 'humane', 'civilised' and 'cultured' in various contexts. Often human beings have natural qualities like prudence, kindness and tenderness. These basic qualities found in his personality, character and nature reflect different meanings based on his environment, values, beliefs and experiences. Therefore, these elements play a special role in enhancing and beautifying the basic qualities of human beings.

In the present context, 'Humanities' is a set of disciplines of knowledge, which are qualitative approaches to the study of different dimensions of the human condition and in the context of not using only one scale to define any subject committed to adopting. Unlike other subjects, 'Humanities' is not a group of scientific and technical subjects. It is relevant to mention here that should not be taken in the sense of other similar words 'Humanism' and 'Humanitarian'. We should understand the difference in meaning of these words very well. The word 'Humanities' is used for a particular set of academic subjects; the meaning of 'Humanism' is reflected in the context of a particular Philosophical School (of thought); and 'Humanitarian' is related to any social concern and human interest.

Now you must have understood the meaning of 'Humanities' very well. In this direction, some definitions related to 'Humanities' are presented here which will be helpful in clarifying the meaning of 'Humanities'. These definitions are as follows :

1. Under Humanities come such disciplines which mainly study the human condition through analytical, critical or reflective means which are different from the means related to experience and observation adopted in the field of natural and social sciences.
2. Humanities is that branch of education which includes subjects like arts, classical texts, philosophy, history, psychology etc.
3. Humanities is the study of literature, languages, philosophy, arts, etc. and not mathematics or science.
4. In Humanities, the subjects of classical texts, foreign languages, linguistics, literature, philosophy, religion, etc. often come.

It is clear from the presented definitions that 'Humanities' means the study of arts-related subjects, such as painting, sculpture, music, dance, drama, literature, language, philosophy etc. in the context of knowledge. All these subjects/areas are different branches of study of human feelings, emotions, thoughts, and relationships. Therefore, the study of art is the study of human beings only. Since Humanities is the study of art-related subjects, it is concerned with the importance of human form, its feelings, and its emotional expression. It is also worth

mentioning here that ‘Humanities’ focuses more on the exchange and analysis of ideas and feelings of human quantity, rather than on the creative expression of art and numerical interpretations of scientific subjects.

5.2.2 Humanities : Nature

‘Literature’ is a very broad term in itself. In fact, the entire body of knowledge is the accumulated literature. Under this, all the achievements of subtle knowledge are included from the general introduction of things. It is also used in the sense of the accumulated store of knowledge i.e. complete literature, and also only in the sense of Creative literature. When the word ‘literature’ is used in the sense of complete literature, it becomes indicative of the broad meaning of literature and when in the context of Creative literature, it becomes indicative of limited-narrow meaning. But this field-division does not end here. To get information about the literature of Humanities subjects, it is necessary to understand the subtle classification of the entire literature.

For the sake of convenience, the entire literature is mainly divided into two parts. These are - (1) ‘Literature of Creative subjects’; and (2) ‘Literature of non-literary subjects’, which is also called ‘Literature of classical subjects’.

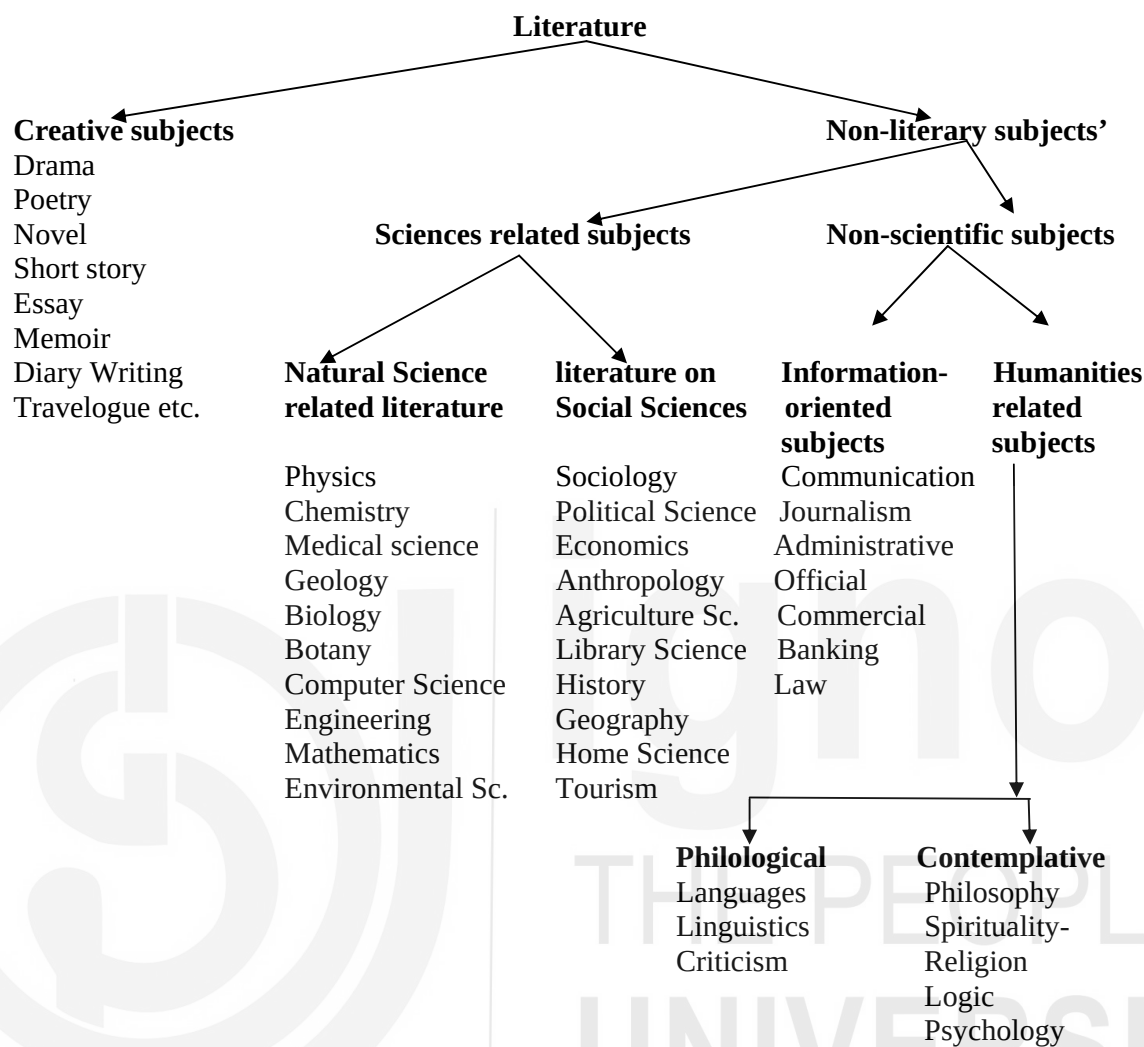
(1) Literature of Creative subjects : Creative subjects include literature of pleasure in which there is predominance of emotion, feeling or sensation. Creative literature includes literature written in various literary genres. For example, drama, novel, short story, poem, essay, autobiography, biography, diary, memoir, reportage, travelogue etc.

(2) Classical Literature of the subjects : Classical (non-literary) subjects include knowledge-text of different subjects. Knowledge literature can also be further divided into two major sub-parts - (a) Science related literature; and (b) literature relating to Non-Scientific subjects.

(a) Science related literature includes Natural Science and Social Science literature. On this basis, Science related literature can be divided into two parts - (u) Natural Science related literature; and (ii) literature on Social Sciences. Physics, Chemistry, Medical science, Geology, Biology, Botany, Computer Science, Engineering, Mathematics, Environmental Science etc. are included under ‘Natural Science literature’. Political Science, Economics, Sociology, Anthropology, Agricultural science, Library Science, Home Science, History, Geography, Tourism etc. are included under ‘Social Sciences literature’.

(b) Literature relating to Non-scientific subjects includes subjects other than Natural Sciences. Non-scientific literature can also be divided into two parts - ‘Literature of Information-oriented subjects’ and ‘Literature related to Humanities subjects’. Information-oriented literature includes Mass Communication and Journalism, Administrative and Official, Commercial and Banking, Legal literature etc. Humanities subjects include Languages, Linguistics, Psychology, Philosophy, Spirituality, Religion, Logic, Criticism etc. Out of Languages, Linguistics and Criticism are called **‘Philological Humanities Literature’** etc.; and Philosophy, Spirituality-Religion, Logic and Psychology are called **‘Contemplative Literature relating to Humanities’**.

This thematic classification of the entire literature can be easily understood with the help of the following diagram:



Thematic Classification of Entire Literature

It is clear from the above diagram that the subjects of Humanities includes languages, linguistics, psychology, philosophy, spirituality, religion, logic, criticism etc. also. It can be said about these subjects of Humanities that there is often a combination of different types of trends, such as factualism, informativeness, idea-predominance, thinking-predominance, and conceptualism etc. These are called Humanities subjects, but it is also worth noting that the nature of all these is not of the same, but of a mixed type. Therefore, there is some difference in the form of all of them. It cannot be the same because it is natural that the form of literature of all subjects of the same nature is of the same type and the form of literature of subjects of different nature is different. On this basis, it can be said that the form of literature related to languages and linguistics and the form of literature related to esoteric and complex ideas/thoughts like philosophy and psychology cannot be exactly the same, there will be some difference between them.

It would not be inappropriate to mention here that it is not necessary that the classification of different types of literature in this Unit should be universal. In fact, there may be a possibility of slight differences in this classification. Many opinions are prevalent regarding Humanities subjects as well. Some people sociological and information-oriented subjects are also in

favour of keeping them under Humanities and some prefer to keep them in separate sections. This situation becomes clear when the same word is used in different subjects. For example, there are many words that are used in both administration and Humanities.

There are some words which are used in both Humanities and science. For example, the word 'analogy' is used in Chemistry, Logic and Criticism. Similarly, 'elasticity' is used in the Economics branch of Social Sciences, Linguistics and Philosophy.

There is a big group of technical terms whose basic concept seems closer to Science, but they are used in both Humanities and Science. On the contrary, there are some words whose basic concept is closer to Humanities, although they are also used in the field of Science. For example, 'code' is used in the field of Political Science and Mass Communication. Similarly, 'cross' is used in Physics, Biology, History and Administration.

On the basis of the above discussion, it is clear that the classification of subjects of different fields of knowledge and science cannot be called authentic because many subjects appear to enter each other's sphere. Therefore, classification of subjects is possible only at the gross level, not at the subtle level. Hence, thematic classification has been done in this part of the unit only from the point of view of convenience and prevalence.

'Science' was initially confined to Natural Sciences (such as Physics, Chemistry, Biology, Botany, Zoology etc.) but later this word was given a wider interpretation - 'Science is the systematic study of any subject'. Today there are hundreds of languages of Science, such as Architectural Science, Home Science, Agricultural Science, Library Science, Environmental Science etc. Now-a-days such subjects are also being kept under Social Science. Earlier, all disciplines other than Natural Sciences were included under Humanities, but now disciplines with almost similar nature are being classified and named. As a result, only a few disciplines are left in the Humanities.

In this unit, discussions will be held only in the context of Languages, Linguistics, Psychology and Philosophy subjects under Humanities. These include Languages and Linguistics such as Philological subjects and philosophy are included. Psychology can also be said to be a subject between these two, because along with thought/information, elements like contemplation, cognition are also present in a more or less proportion.

5.3 Relevance and Characteristics of Literature relating to Humanities

By now you must have been clear about the meaning and nature of Humanities literature. Now we will focus on its importance and features. Let us, first of all, know what is the importance of Humanities literature.

5.3.1 Relevance

Art is very important in our life. It is one of the most important and oldest forms of expression developed by humans so far. In fact, it is a language that is full of feelings and is also important for human beings living together. Art is such a sensory medium through which human beings express their thoughts and their feelings. In this sensory medium, a symbolic language is used in which the beauty of form is inherent. It touches our hearts and minds, awakens our emotions, ignites our imagination, and activates our senses. Therefore, every art-related object reflects the ideals, aspirations and concerns of human beings living in a particular era.

Humanities subjects (such as ideas, words, concepts, fiction etc.) is related to objects that help us to understand our world and our lives. Humanities subjects introduce us to such

people, to such places and to such ideas, which we were still unaware. Because Humanities subjects expose us to other unfamiliar people and their views on life, they also help us to identify what is important to us in our own lives and what we can do to improve them. In relating us to other people, they tell us what is right and wrong, what is true and what is false, in the context of our own life history and tradition. So Humanities subjects help us to meet the challenges that come before us from the perspective of family, community and nation.

5.3.2 Characteristics

Humanities related literature is literature of special nature in itself. There is not only one dimension to the distinctive nature of Humanities literature and its literary character. It is characterized by several dimensions:

1. Special Emphasis on Factuality and Informativeness

In Humanities literature, as in other scientific subjects, special emphasis is placed on factuality and informativeness. Humanistic literature includes various branches and sub-branches of the study of human sensibilities and disorders. At the core of these branches lies the idea of imparting knowledge to man. If knowledge is not factual and informative, then its proper and meaningful communication will not be possible. Therefore, special emphasis is laid on factuality and informativeness in Humanities related literature. For example, if any litterateur wants to present a scene of drought-flood etc. in his creative writing, he will present their dreadful and heart-wrenching scene to the reader through words. On the other hand, if information is given on a non-literary subject, it will be presented in factual and informative form, which can be in such a way that how many districts-villages were flooded or drought, how much loss of life and property etc. To know the factuality and informativeness in the language of Humanities, let us come to see the following English translation of Hindi extract from Prof. Hem Chandra Pande's book '*Bhasha: Swaroop aur Sanrachna*' :

Language is a system in which signs are used as a means of communication. A sign is a substitute for a substance, concept, action, quality, etc. and is its signifier. Substance, concept, action, quality - for all these we will use the word 'substance' in the general sense. Words denoting different substances are actually signs because there is no direct relation between the word and the substance. It is a symbolic relation. All the words like book, water, write, read, good, beautiful, big, small etc. indicate certain things and actions. (p. 25)

2. Clarity, intelligibility and simplicity

Clarity, comprehensibility and simplicity are the main qualities of humanistic literature. Relatively more expressions of these types of qualities are found in Humanities literature so that emotion-communication can be done in a better way. For example, see the following English translation of Hindi excerpt from Prof. Devendra Nath Sharma's book '*Bhasha Vigyan Ki Bhoomika*' (The Role of Linguistics) :

'Language is related to thoughts or feelings i.e. language is the means of expression of thoughts or feelings. The person is influenced by the environment or situation and the expression of that influence is in the form of reaction. That reaction can be mental, physical or verbal. When we see or hear something unpleasant, our mind becomes agitated and upset, which is the result of our mental reaction. If a particle of fire falls on our feet from anywhere, we immediately remove the feet. This is our physical reaction. Many times our reaction remains verbal. Saying something in a happy voice with a smile on someone's congratulatory sentence, giving a bitter answer when someone is angry are our

natural verbal reactions which are related to the mind. It means that the language will not be pronounced until a thought or feeling arises in the mind, and it is needless to say that thought or feeling is related to the mind (brain) which is the subject of psychology. Therefore, it is not possible to have a complete discussion of all aspects of language without knowing psychology. (p. 25)

3. Objectivity and Impersonality

Objectivity and impersonality prevail in Humanities literature. It does not require the impression of a person. The language of Humanities literature is not subjective but objective. In this, literary subjective and personal expressions like 'I tell my sad story by crying and sobbing' and 'I have changed in the water of sorrow, came yesterday and went today' are often not available.

4. Use of Technical Terminology

The excess of definitions and semantics of the words of Humanities literature is specially present. The basic reason for this is that Humanities literature is actually 'knowledge-literature'. This literature is created to transmit knowledge. In this communication, such words are used, which are not the words of the language of general behaviour, but are of the special field of knowledge. The specialty of these words is that their range of meaning is fixed in the same area i.e. they have a specific and definite meaning in a particular discipline. For example, the basic meaning of 'metal' is - 'the base material from which many things are made.' In Grammar, this word is indicative of adverbial root words i.e. then in Metallurgy it gives sense of some base-materials i.e. gold, iron, zinc, silver etc. Due to their definiteness of meaning, these words are helpful in spreading knowledge, technical style develops. For example, see the following English translation of the Hindi quote from Prof. S.B. Singh's article titled 'Sampark Bhasha : Ek Taatvik Adhyayan' in the edited book '*Sampark Bhasha Hindi*' (Contact Language Hindi) by Dr. B.Np. Tiwari :

Official language is not the language of the ruling class, it is the language between the ruler and the ruled. The communication relationship between the ruling class is linear or horizontal where the communication is between two equal levels. The communication between the ruler and the ruled is vertical in which the communication takes place between the upper class and the lower class. The use of common language at both the linear and vertical levels is the need of a democratic nation. Where this does not happen, many social and linguistic disparities arise. (p. 59)

You must have noticed that in the above quote , the terms 'official language', 'ruling class', 'ruler', 'ruled', 'communication', 'linear communication', 'horizontal communication', 'vertical communication', 'upper class', 'low class', 'democratic nation', 'social inequalities', and 'linguistic inequalities' are definitions.

5. Excess of Denotative and Conceptual Expressions

There is an abundance of denotative and conceptual expressions in Humanities related literature. Connotativeness is a special type of word-powers. Therefore, it is one of the three types of word-powers. Denotative words power-rich language express only simple meaning. For example, different uses of 'water' can be seen - 'He drinks water.', 'He waters the plants.' is a denotative expression and 'He fills his water.', 'His water is drained' is denotative. There are expressive uses. In the same way, conceptual expressions can also be seen, which show that some concept is involved in the expressions used in a particular language.

6. Non-Ambiguity and Non-Figurativeness

There is more use of non-ambiguity and non-figurativeness in Humanities related literature. Figurativeness can be the jewel of Creative literature. Connotative-Sarcasm oriented language can give ambiguity to the language of Creative literature, but in the literature of knowledge like Humanities, ambiguity hinders smooth communication of meaning. What is meant to say is that there is unambiguity in Humanities literature.

As already mentioned in the language of Humanities literature, special emphasis is laid on factuality and informativeness. But this is possible only when his language is unadorned. Non-ambiguity and non-figurativeness make Humanities literature lucid and comprehensible.

All these features differentiate Humanities literature from Creative literature. It is mandatory to follow all these elements in the translation of Humanities literature.

5.4 A debate on Nature of Translation of Literature relating to Humanities

The success of any type of translation depends on the nature of its original language text. Although language-texts can be of many types, but mainly three types are mentioned - (1) Scientific, (2) Humanities; and (3) Literary. All these three types of language-texts require different translation methods as all have different subject-matter and linguistic-nature. The classification of the nature of basic language-texts is possible only on the basis of the classification of language-functions propounded by the theory of language. Determining the purpose or function of language-use is one of the many aspects of language theory. In this context, more importance is given to authenticity of thematic facts in translation of scientific language-text, communicativeness of basic meaning in translation of Humanities language-text and effectiveness of original sensation/sympathy in translation of literary language-text.

No matter what kind of material the translation is, the essential condition for its success is that the translation should not seem like a translation. In all types of translation, on the one hand, the clarity and comprehensibility of the text/message/idea/sense/subject of the source language is expected, and on the other hand, the spontaneity and naturalness of the language of the text translated into the target language is expected. To fulfill this purpose, from the theoretical point of view, the system of 'word-for-word translation' and 'sense-for-sense translation' is adopted in the translation of Humanities literature. But from a practical point of view, there is a possibility of slight change in their ratio.

By now it has become clear to you that there are mainly two types of topics in Humanities literature - non-scientific knowledge text; and philosophical-psychological text. Obviously, non-scientific subjects (knowledge-texts) are simple and gross/macro in comparison to esoteric subtle subjects like philosophical-psychological, religious, logical. Therefore, in the translation of Humanities literature, the use of 'word-for-word translation', 'sense-for-sense translation' or a mixed form of both is expected. A blank word-for-word translation does not prove to be helpful for the translation of literature related to philosophy and psychology.

You have to kept in mind that a translation of Humanities literature done entirely by 'interpretive translation', 'summary translation' or 'adaptation' method is also not relevant because by doing so, there is a possibility of hurting the effect of authenticity and informativeness of the original concepts/ideas, accuracy of facts. Suppose while translating words like 'Transcendentalism', 'Metaphysics', 'Quintessence', 'Catharsis', 'Mimesis', if we give a long explanation of the whole concepts related to them or describe their essence in detail, then it would not be appropriate from the point of view of translation. Reading such a

translation, the reader will get confused and the translation will not be comprehensible to him. Similarly, if we start describing all the branches of psychology in detail while translating the expression like 'study of behaviour' (like normal psychology, abnormal psychology, child psychology, animal psychology, social psychology, developmental psychology, practical psychology etc.) then it would also not be appropriate. Explanation of Hindi words like 'karma', 'soul', 'death', 'rebirth', 'God', 'Jiva', 'heaven', 'hell', 'sin', 'virtue' telling the essence cannot be called appropriate from the point of view of translation. The expressions in which this type of vocabulary is used should be translated smoothly and fluently. Footnotes can be used extensively in this because it is necessary to inform the reader about concepts. Otherwise, the reader will not get any benefit from that translation because he will not be able to know the original words/phrases/expressions related to the particular subject of the source language. Although there is no place for freedom of translation like Creative literature in Humanities translation, still some leeway can be taken for the clarity and authenticity of the subject and facts, especially in the translation of philosophical-psychological subjects. In this way, it can be said that the method of translation in Humanities translation also varies according to the subject, such as the translation method of linguistics, languages etc. will not be exactly the same as that of esoteric and complex subjects like philosophy-psychology.

Most of the scholars are of the opinion that the expression-skill is not as important as the topic/ideas/feelings in the translation of Humanities literature. Johnson's views are relevant to justify the principle that 'Translation is the transfer of meaning from one language to another'. To some extent this seems to be true in the context of classical subjects and especially non-science subjects. Well-known translation-thinker Tytler, while expressing his views on translation, has said that, '.... there is a clear difference in the tendency and innate nature of different languages. For this reason, the general opinion is that the translator, after assimilating the thoughts of the original author, should properly express them in his own words, paying adequate attention to the meaning and significance of the original.

As much as this statement of Tytler is applicable to literary translation, it is also applicable to the translation of Humanities literature. Therefore, for the success of translation of Humanities subjects, any competent translator tries to communicate in his vocabulary according to the nature of the translated language only after knowing and understanding the meaning of the original text. Only in such a translation done by the translator can the reader of the target language get the same pleasure as the original work.

5.5 Translation of Humanities Literature : Prerequisites

In the last two section of this unit, you have become well-acquainted with the meaning and nature of Humanities literature. Let us now consider the prerequisites for translation of Humanities literature. It has many dimensions. For example, for the success of translation of Humanities literature, which translation method should be adopted, what type of language should be used, and what things should be kept in mind by the translator.

5.5.1 Sound Knowledge of the Subject-Area

In the translation of Humanities literature, it is also necessary that the translator has sound knowledge of that particular subject/field, otherwise he will not be able to translate it or do justice to it. This type of translation is often very important in the context of subject, research, survey, project, teaching and teaching-mediums. It is often not possible for a translator to have sound knowledge of more than one subject. The translator is successful only when he reaches the reader as close as possible to the meaning of the original work and immerses him in the original spirit. The problem of a translator is not limited to a good knowledge of both languages. He has to first immerse himself in the subject he has to translate and then

internalize its subtleties. Only after establishing complete knowledge of the original subject and identification with the inspirational purpose, it will be able to get success in translation. For example, in order to translate any religious material into English, the translator must have knowledge of the Bible (specifically the 'Old Testament'). Similarly, without the knowledge of Hindi Vedas, Puranas, Upanishads etc., foreign scriptures cannot be successfully translated into Indian languages. To translate cultural literature, the translator must have sufficient knowledge of both the cultures and the environment. In its absence, knowledge of both the languages will also be of no use to him. It is also necessary to be familiar with the lifestyle, customs and social beliefs of the people in whose language the original work is written.

Sound knowledge of that subject/field is also required while translating Humanities literature, otherwise the semantic damage to the original concepts and factual authenticity may be done.

5.5.2 Use of Technical Terminology

Two things are very important in the translation of Humanities literature - thought; and expression. In other words, it can be said that sound/adequate knowledge of subject matter and language style is necessary for any translator in Humanities translation. As far as language style or linguistic expression is concerned, terminology plays a special role in it. Therefore, in the context of translation of Humanities literature, it becomes necessary to consider the kind of technical terms used to communicate the subject matter of the source language in the target language at the level of language. For this, first of all we have to understand the difference between common words and technical words. As such, there is no difference between general words and technical (definitional) words from the point of view of linguistic structure, because no rule for the formation process of technical (definitional) words is different from the formation process of general words. But from the point of view of semantic structure, there is an important difference between common words and technical words. The important difference between these two is that common words can be used as status quo in all the three word-powers (i.e. denotative, connotative and sarcasm word-power), while technical words are used only in the sense. For example, in the field of religious text, Hindi expressions '*incarnation of Yudhishthira*' and '*son of Tansen*' in the field of music, respectively, have the meaning of 'righteous' and 'singer', while their sarcasm is 'extremely false' and 'unsympathetic singer' respectively. In this way, technical words are used everywhere in their respective subject areas in the same sense.

Technical Terms is subject-relative. Each term is essentially associated with some subject area. The intended meaning of that word can be understood only in the context of that subject-area. For example, the English word 'Action' is used in Philosophy as '*karma*', in Philology as '*karya*' and in the field of administration as '*karrvai*'.

In the absence of technical terminological standardization, more than one word may be prevalent for the same concept or one word may have more than one meaning. Standardization is the selection of one specific word from more than one word. But this is often not possible for esoteric and complex subjects like Philosophy and religious text. The reason for this is that in Philosophy-Psychology related terminology it is rarely possible to use technical terms with definite and specific meaning like in other subjects. In such words, the possibility of meaning-shrinkage, meaning-expansion and meaning-change also often remains because subtle meanings are contained in them. Most of such words may also have to be explained. Therefore, the synonyms of the words related to the subject of Philosophy and religion are not always pre-determined. They are often used as translated words, although their meaning has to be explained through footnotes. In such situations, the problem can be solved only by getting the words from the literal translation or paraphrasing and clarifying their original meaning in the foot-notes.

5.5.3 Selection of Appropriate Equivalent

In the translation of Humanities literature, the aim of the translator is to accurately translate what was said by the original author in the same sense. For this, understanding the meaning of the word in the context of a particular subject and using its correct synonym in translation is an important task.

In the context of Psychology and other subjects, the situation can be confused due to non-use of the popular and acceptable terms in the standard form and there is a disturbance in the clarity of the subject. Therefore, in the translation of the subjects of Psychology, as far as possible, technical words should be used and along with this attention should also be paid to the ease of the language. This is equally applicable to all the languages and languages of Humanities.

5.5.4 Clarity in Expression of Thematic and Linguistic Features

The specialty of the translation of the literature of Humanities subjects is that the information, feelings, concepts etc. contained in the original language are preserved as much as possible in the target language. In this, more attention is paid to emotion or idea than to style. In this type of translation, instead of stylistic features, only thematic features are seen. The translation of literature from Humanities subjects has the following characteristics :

- (1) Special emphasis is laid on factuality and informativeness.
- (2) Clarity, comprehensibility and simplicity are its main qualities.
- (3) The importance of objectivity and impersonality remains.
- (4) Excess of definitions and semantics of words is especially present.
- (5) There is an abundance of denotative and conceptual expressions.
- (6) Unambiguity and non-figurative language is used more.

All these characteristics distinguish the translation of Humanities literature from the translation of Creative literature. It is mandatory to follow all these elements in the translation of Humanities literature.

The basic elements of the success of translation of Humanities literature are the simplicity, naturalness, clarity, comprehensibility, certainty etc. of thematic and linguistic communication. Therefore, more attention should be paid to them. The obscurity and awkwardness related to the expression of the subject and language and the bias towards blank word-for-word translation etc. prove to be fully responsible for bringing the translation of Humanities literature into the category of failure. Therefore, the translator should take due care for this.

Regarding translation, renowned translation theorist Eugene A. Nida has said that meaning and style are both important in translation, but if for some reason equivalence is not possible in both of them, priority should be given to meaning. Due to the necessity of creative talent for the translator in literary translation, Humanities literature is often considered easier in comparison. But it is not that easy either. Literary translation only requires adequate knowledge of the source language and the target language, not so much the knowledge of the subject. On the other hand, in the translation of Humanities subjects, it is necessary to have sound knowledge of both the languages as well as proper knowledge of the subject. Undoubtedly, the translation done without understanding the subjective original meaning will become awkward, artificial, difficult and complicated.

In the translation of Humanities literature, if on the one hand there is an imperative of originality, then on the other hand it is also necessary to protect the nature of the target

language. Simplicity and comprehensibility of the translated language is an essential condition in every situation. For this, the translator should have adequate knowledge of the nature of both the languages, their syntax, vocabulary, communication etc. To determine the meaning of the message contained in the source language, it is necessary to have a sound knowledge of the subject, because the translation does not remain interesting and natural by keeping the opposite word for the word without understanding the original meaning. Sometimes even the possibility of distortion of meaning in such a translation cannot be ruled out. This is particularly applicable in the field of Philosophy and religion. To translate literature related to philosophy and religion, it is necessary to have sufficient knowledge of this subject.

On the basis of the above discussion, you must have understood very well that what is the nature and form of translation of Humanities literature. Humanities translation is mainly translation of sense rather than translation of words or as the case may be, a combination of both in more or less proportion. Its language-style is also subject-oriented i.e. as is the subject, so is the language style. In Humanities translation, the translation method also varies according to the subject, such as linguistics, languages etc., the translation method will not be exactly the same as that of esoteric and complex subjects like Philosophy-Psychology. In this, along with the qualities of conciseness, accuracy, interestingness etc., it is also necessary to have linguistic qualities like simplicity, comprehensibility, clarity etc. as much as possible. Apart from this, in Humanities translation, translation done by fully interpretive translation, abstract translation or adaptation method is also not relevant. Yes, footnotes are used extensively in this because it is necessary to inform the reader about contemplative concepts. If this is not done, the reader will not get any benefit from that translation because he will not be able to know the original words/phrases/expressions related to the particular subject of the source language. Although there is no place for freedom of translation like Creative literature in Humanities translation, still some liberty can be taken for the clarity and authenticity of the subject and facts, especially in the translation of philosophical-psychological subjects.

5.6 Translation of Humanities Literature and Creative Literature : Distinct Features

By now, you have learned about the meaning-nature, linguistic characteristics, nature of translation and prerequisites of Humanities literature. Here it is also necessary to know what is the difference between the translation of Humanities-related literature and Creative literature.

We know that translation is the search for equivalent expressions at different levels from one language to another. Since the source language differs in its nature from the target language in many ways, this search for equivalent expressions makes the translation task more and more difficult. But this proportion of difficulty varies according to the nature of the material related to the particular subject or area. This problem becomes even more complicated when the difference between the two languages in thematic and linguistic, cultural, social, philosophical, geographical environment etc. increases, as in the case of English and Hindi. Both the languages have their own structural features and at every level there is micro and somewhere macro difference. In Humanities translation, this difference is often of gross nature whereas in literary translation it is of subtle nature. As far as the subtle nature is concerned, this subtle difference in literary translation is poetic-based, which makes it difficult. In contrast, due to non-predominance of classical elements in Humanities literature, it is relatively easy. But, still, the translation has to be made successful and natural. For this, the translator has to adjust the level of text and style in both the languages. In its absence,

many types of inconsistencies arise in translation, which can be solved by the translator with his talent, experience and understanding.

In the translation of Humanities literature, it cannot be said that it is completely literal. In order to make the translation natural, the translator has to work hard. Often such translation is a mixed form of word-for-word translation and sense-for-sense translation.

It is very clear that there is a problem of translation of poetic elements in the translation of creative literature. For this type of translation, it is necessary for the translator to have creative talent. On the contrary, the problems of images, symbols, figures of speech, idioms, proverbs, word-powers and cultural references etc. are almost negligible in humanities-related translation.

Points of difference in translation of Humanities and Creative literature

The points of difference in translation of Humanities and Creative literature are as follows

- In translation of Humanities literature, practical and appropriate use of specific professional and technical language is made, whereas in the translation of literary subjects, the creative expressions of the language are used.
- Humanities literature, the translator's work is governed by practice, technical terms and flatness, while in literary translation the situation is the opposite.
- Humanities literature is objective and gross while that of literary translation is subjective and subtle.
- Humanities literature, single meaning expressions are often used and in literary translation, multiple meaning expressions are used. In other words, it can be said that translation of Humanities literature is denotative while literary translation is denotative and sarcasm-oriented.
- There is an abundance of non-synthesized images in Humanities literature and in literary translation, there is an abundance of synthetic images.
- Humanities literature, lexicographic meaning predominates and in literary translation, referential/contextual meaning prevails.
- In Humanities literature, ideas, concepts, information and content are transferred to another language, whereas in the translation of Creative literature, a culture is recreated in another language.
- In Humanities literature, the subject is important and the style is secondary, while in the translation of Creative literature, both the subject and the style are important.
- In Humanities literature, the emphasis is on originality, whereas in literary translation, the translator almost takes the support of free translation/interpretation.
- In Humanities literature, the ratio of word-for-word translation is slightly higher than sense-for-sense translation, whereas in literary translation, the ratio of word-for-word translation is very less as compared to sense-for-sense translation.
- Classical elements predominate in the translation of Humanities literature, while poetic elements prevail in literary translation .

5.7 Translation of Philological Literature relating to Humanities

In translation, ideas/expressions of one language are expressed in another language. In other words, it can be said that translation is to express the original meaning of the composition of the source language in the same language style through equivalent expression. In this way, sound knowledge of two languages is necessary for translation. Dr. Suman Kumar Gupta believes that Linguistics is the scientific study of language/languages and language is such a system of random and spoken sound symbols by which a society exchanges its expressions/ideas. Therefore, language is a powerful medium of exchange of ideas/ideas of community/society. When we want to express the feelings/ideas expressed in the language of one society/community in the language of another society/community, then we have to go through the process of translation. It would be pertinent to say here that though all languages are similar at the level of cognition, there are differences in expression at the level of expression. It is because of this difference of expression that we need translation. As far as relation between Linguistics and Translation are concerned, translation is a branch of Applied Linguistics. The principles propounded in Linguistics are applied under Applied Linguistics, hence translation is also known as an application of Applied Linguistics.

The main reason for the problems arising in translation is the difference in the nature of languages. In the context of Linguistics, the problems of translation can be divided into two parts. Western translation thinkers like Naida, Catford etc. have named these two classes as 'Contextual equivalence' and 'Formal equivalence'. Famous translation theorist Peter Newmark calls them 'Communicative Meaning' and 'Syntactic Meaning' respectively. In other words, we call these 'Semantic problems' and 'Stylistic problems'.

5.7.1 Semantic Problems

The translator grapples with semantic problems when translating literature related to languages and linguistics. The main problems that come under these semantic problems are as follows - word-for-word translation versus sense-for-sense translation, connotative and sarcasm, socio-cultural elements, idioms and proverbs, similar vocabulary. Let us consider them one by one.

(i) Word-for-word translation vs. Sense-for-sense Translation : In the context of linguistics, it is necessary for a translator to have a good knowledge of semantics because in this the semantic side of the language/languages is studied and analyzed. If the translator is not able to understand the meaning/importance of the source language, then he will not be able to express it in the target language. The problem of determining meaning in translation arises because of the different semantic structure of each language. Due to the difference in the grammatical structure of each language, there is a difference in their meaning-determination. The meanings emerging from the expressions of the source language and the target language are often not the same, nor are the context-associations of the expressions and units of the two languages the same. Not only this, for each word, similar words are not found in other languages. Even when the same word is found, many types of problems arise in translating it. From this point of view, the translator has to face the problem of word-for-word translation versus sense-for-sense translation. Linguists believe that lexical word-for-word translation is often not successful because there is a possibility of obscurity, non-ambiguity, complexity of meaning and sometimes it also leads to loss of meaning.

(ii) Connotative and Sarcasm related problems: Among the semantic problems, the next problem is to successfully communicate the connotative and euphemistic meaning in the target language instead of the denotative meaning. This task becomes difficult due to the natural differences of languages. In order to successfully convey usages/meanings in the

target language, the translator should give additional information or explanatory hints clarifying the desired meaning in footnotes as well, as needed.

(iii) Socio-cultural problems : Socio-cultural vocabulary emerges as a problem in proper understanding of the content of any language. The reason for this is that each culture has its own characteristics and according to those characteristics there are some specific vocabulary and expressions in the language of that culture. Translating such terms/expressions is a big problem because equivalent terms/expressions are often not available in the language of the other culture. Due to non-availability of equivalent expression, the sharpness of the text ends. For example, Democles' sword, Herculean task, Baptism of blood, Old Adam, exile of Ram in 'Ramayana', 'Sita-Swayamvara', 'burning of Lanka', Draupadi churhan in 'Mahabharata', crucifixion of Jesus Christ in 'Bible', Bhishma Pratigya, Angad's foot, devil's intestine, Narasimha avatar etc. many expressions are presented as a challenge for the translator.

The same is the case with the terminology related to relationships-kinships. Like, 'Uncle' of English, 'Aunt', 'Niece' and 'Nephew' words are difficult to say in Indian languages, then Hindi's 'Fufa', 'Mama', 'Tau', 'Kaka', 'Mousa', 'Sadhu' etc. in English.

Names of cultural places and characters also create similar problems, such as 'Kailas Parvat', 'Govardhan', 'Mansarovar', 'Jerusalem', 'Dasaratha', 'Hanuman', 'Ravana', 'Jatayu', 'Sugriva' etc. To overcome this problem, almost identical terms/expressions of the source language available in the target language can be taken. For example, the words 'Adam and Havva', 'Ganesh', 'Bhagirath Prayas', 'Yamraj', 'Kamdev' etc. can be put respectively in Hindi for the expressions 'Adam and Eve', 'Janus (Roman God)', 'Herculean efforts', 'Lucifer' 'Cupid' etc. However, the replacement of such expressions sometimes creates the possibility of disaster. For example, in Hindi for 'Garuda/Jatayu', 'Grishma', 'Patjhar' respectively for 'Phoenix', 'Summer', 'Winter' etc. If an attempt is made to know the reason for this type of disaster, then the fact emerges that it is due to the specialties of two cultures because the sun shines, rains, summer or autumn season etc. are indicative of different circumstances in both the cultures.

As a solution to this problem of socio-cultural terms/expressions, it can be accepted that such an expression of the origin can be kept in the target language also, but for doing so, its cultural background should be mentioned in the footnote. Apart from this, descriptive or explanatory explanation can also be presented according to the situation.

(iv) Problems of Idioms and Proverbs : The use of idioms and proverbs is also seen in the language to express feelings or thoughts in fewer words. By using them, there is an increase in the expression of the language. The original source of idioms and proverbs is the culture of that country or language. They are the carriers of the cultural consciousness of that country-language and strengthen the expression of the language by giving it uniqueness. Wherever a narrative or example is not able to clarify the matter, there two or four symbolic words of idiom-proverb etc. give a detailed explanation. Therefore, their use brings spontaneity and naturalness in the language.

The more expressive the use of idioms and proverbs, the more difficult its translation becomes. With the analysis of the words and meaning of an idiom, the context of cultural, economic, social, religious and psychological environment and circumstances of the time and society becomes clear and realised. Their translation is a creative but challenging task. For their translation, the creative talent of the translator is also required. In their translation, the translator has to preserve the expressiveness, take into account their ethnographic background, take into account their word-combination, preserve their semantic and stylistic

features in the target language and preserve the originality of the source language. One has to deal with problems like creating the same effect as idioms and proverbs in the target language.

The problem of translation of idioms and proverbs comes in front of the translator in different situations and he has to solve it according to his discretion. For this, one should first search for similar idioms-proverbs in the target language.

Another solution involves searching for closely related idioms in the target language.

The third solution is related to word-for-word or literal translation. Idioms-proverbs should be translated word for word according to the need and situation.

Paraphrasing is also a solution to the problem of translation of idioms and proverbs. Under this, the support of translation of idioms and proverbs is taken. It is to be noted that such translation is done only when the word-for-word translation is not capable of conveying the correct meaning.

In the fifth situation, explanatory translation of idioms has to be done. This is done when the translation of idioms is not able to convey the full meaning contained in the idioms of the original language.

(v) Problem of similar terminology : In the context of semantic problems, the last problem is related to the semantic problems of similar terminology. The biggest problem in this is the difference of meaning because this difference is very subtle. The translator must be very careful about this subtlety of difference in meaning of words.

5.7.2 Stylistic problems

While translating literature related to languages and linguistics, translation grapples with semantic problems as well as stylistic problems. Under stylistic problems, problems arise in front of the translator at the level of sound, word, form and sentence, which he has to solve as much as possible. Let us consider these also one by one.

(i) Phoneme-level problems : The first problem of stylistic problems is presented at the phoneme level. Often the translator searches for almost identical uses in the target language for phonetic expressions, sound-based figures of speech etc. used in the source language, in order to bring phonetic beauty to his translation. But this task is difficult because such sounds are different in each language. At the phoneme level, problems arise in the context of translation, transliteration and phonological-adaptation of phonemic words.

There are many such phonetic words in any source language for which it is often difficult to find similar words in the target language. And, even if found, sometimes the meaning and image of the original gets destroyed. Prof. Gopinathan says that if the same root phonetic word is not found in the target language, it is replaced with the same sound, but the translation does not seem natural because the meaning of the root is not transferred in the translation. Some phonetic words are different even when they are similar and their phonetic and semantic beauty is different, such as 'twinkle', 'flicker' etc. These types of phonetic words are often used for literal translation because it is very difficult to preserve their phonetic beauty in translation. As a second solution, replacement with a similar phonetic word may be possible.

One dimension of the phoneme-level problem is related to transliteration and phonological-adaptation. In transliteration, the original must be read accurately so that the correct term is transferred to the target language. Phonological-adaptation consists of writing the input

vocabulary in accordance with the phonological process of the target language. The same word is written and spoken in different ways in different languages. While transferring the input vocabulary to the target language, its natural pronunciation should be kept in mind. In the case of a pronunciation different from the actual pronunciation of the original word, it can be adopted in the same form if it is already prevalent in the target language.

(ii) Word-level problems : In terms of stylistic problems, after sound, the second problem emerges at the word level. Synonym selection is of utmost importance in translation as it determines the style of a writer. Selecting the correct one from the possible alternatives is a severe test of the translator. This selection is often done from *tatsam-tadbhav* terms, foreign-native terms, vocabulary of educated-uneducated characters, incomplete-synonymous repetition related terms. A choice has to be made depending on the experience and discretion of the translator.

(iii) Form-level and Sentence-level problems : The reason for the stylistic difference between the two languages is the difference in their morphology and syntax. It is because of this difference that problems arise in translation. The greater the difference in the use of gender, number, case, adjectives, pronouns, verbs etc. in two languages, the greater the problems. For example, English has ‘a lot of’, ‘plenty of’, ‘most of’, ‘a great deal’, ‘some of’ expressions that are singular when used for quantity and plural when used to convey a sense of number. For example, ‘a great deal of effort’, ‘some of the books’ etc.

Variation in word-order also causes problems in terms of syntax, as does variation in verb order. For example, the order of English sentences is Subject + Verb + Object. But in Hindi this sequence changes to Subject + Object + Verb.

Similarly, there is a problem in the translation of ‘Active Voice’ and ‘Passive Voice’. The way passive voice is freely used in English, it is not so in Hindi.

Apart from this, the nature of Hindi is of simple sentences whereas that of English is combined and mixed. In adjective clauses in English, the indicative pronoun is placed after the subject, as ‘The boy whom I saw was intelligent.’ But in Hindi it is placed before the subject.

5.8 Translation of Contemplative Literature relating to Humanities

In Section 5.7 of this Unit you have become well acquainted with the various problems of translating Philological Humanities literature. Now, considering the form of translation of contemplative Humanities literature, consider its various problems.

Philosophical and psychological literature is enumerated under Contemplative Humanities literature. In this part the problems of their translation are being discussed. But, before considering them, it would be appropriate to know that what is the literary form of contemplative humanistic literature.

5.8.1 Nature of Contemplative Humanities Literature

As has been mentioned, mainly philosophical and psychological literature is discussed under contemplation-oriented Humanities literature. Philosophy and Psychology originated from life and its needs. Therefore, they are related to the experiences, feelings, mental activities and problems of the whole life of human; all the situations related to the world in which he lives. The problems and situations of life and the world are the origin of Philosophy and Psychology.

Philosophical experiences are often expressed through literature. Therefore, we get to see many such compositions which focus only on these subjects. Particularly noteworthy are the essays of renowned Hindi critic Acharya Ramchandra Shukla written on different sentiments in Hindi, which are compiled in Part-1 of '*Chitamani*'.

Apart from this, philosophical experiences are also expressed directly or indirectly in creative literary works. For example, in Hindi Sachchidanand Hiranand Vatsyayan Agyeya's '*Apne-Apne Ajnabi*', Jainendra Kumar's '*Sunita*', Elachandra Joshi's '*Jahaaj Ka Panchhi*' and Mannu Bhandari's '*Aapka Bunty*' etc. Similarly, the influence of Indian philosopher Maharishi Arvind philosophy is clearly visible in Hindi poet Sumitranandan Pant's poems. His poetic compositions like '*Swarna-Kiran*', '*Swarna-Dhuli*' and '*Vani*' etc. are remarkable from this point of view. In this way it can be said that literature itself comes under the ambit of philosophy. 'Pratyabhigya Darshan' in Jaishankar Prasad's '*Kamayani*', Ramakrishna Paramhansa's philosophy in Nirala's poetry; Arvind-Darshan (Spiritual folk consciousness) and Vivekananda's philosophy in Pant's poetry; the philosophy of the Upanishads can be clearly seen in the poetry of Mahadevi and the pure dualistic philosophy in the poetry of Surdas. Similarly, the impression of Indian philosophy can be clearly seen on many poems of English poets - T.S. Eliot, Yeats, Whitman etc.

Philosophical acquisition takes place at many levels in literary works. For example, in some particular part of the composition, in the middle of the composition, or in the whole composition itself, there exists a philosophical element.

5.8.2 Translation of Contemplative Humanities Literature

Any untranslatable material is often related to any genre, art, science or human emotions, feelings and mental processes. The translator has to face difficulties according to the nature of the text. For translation of scientific text, clear and precise language is required and for literary text, fluid and soft language is required. The field of translation of literary texts is more delicate than the translation of scientific texts. But the analysis of the activities of the inner world requires relatively greater depth. Philosophy and Psychology are such subjects in which the physicality and grossness of science and the melodiousness and subtlety of literature mix together. Therefore, translation of philosophical and psychological texts is a challenging task for every translator, to fulfill which he has to be very careful.

Intricacy and complexity in Philosophy and Psychology are somewhat higher than in other disciplines. This is the reason why difference of opinion is often seen not only in translation but also in interpretation. For example, what is the meaning of Shankaracharya - there is a difference of opinion between the Shankara followers of the *Vivaran Sampradaya* and the *Bhamati Sampradaya*, and this is also natural. Which method should be used for translation of literature related to the subjects of Philosophy and Psychology? In fact, due to the singularity and complexity of subjects like Philosophy and Psychology, translation is the only worthwhile alternative when word-for-word translation does not work. The purpose of translation is to convey the thoughts/expressions of the source language correctly in the target language, whether it is done by word-for-word translation, sense-for-sense translation, or according to the need, a mixed form of these two is used.

It must have become clear to you that philosophical feelings are expressed in literature. This is the reason why many compositions are focused only on these subjects and philosophical realizations are expressed directly or indirectly even in creative literary works. In these, there is a touch of philosophy in some particular part of the composition, in the middle of the composition, or in the entire composition itself. Whatever be the level of philosophy and psychology in the composition, it is necessary for the translator to try as much as possible to

convey the compositional philosophy and psychology in his translation. The problems he has to deal with during this communication process are often presented in the form of symbols, images, cultural references/contexts, mythological analogies, mythological events/characters, archetypes etc. are rooted in philosophical and psychological sites. If equivalent philosophical and psychological expressions are not available in the target language for the philosophical and psychological expressions of the source language, then work can also be done with close meaning expressions. But for this they should be introduced in the footnote.

If the problems of translation of contemplative Humanities literature are considered while classifying them, then they can be seen in the context of synthesis and intensity as well as thematic and stylistic communication. Let us now consider the translation of contemplative Humanities literature in both these contexts.

(i) Problem of Complexity and Density : Philosophy, Psychology, religion, culture and mythology are such areas which are synthetically presented in the compositions. All these mix together to create the density of experience. Due to this intensity of feeling, it becomes difficult to differentiate between them. The translator often has to translate such material. In principle, many things are the same in all of them, so there is no big difference in the translation of the material related to them.

Although, Philosophy and Psychology subjects are kept in the Humanities literature, but at the practical level, the form of translation of the literature of these subjects is quite similar to the form of literary-cultural translation. Philosophy and Psychology are not the same subjects as Economics, Mathematics, Political Science, Library Science, Agricultural Science, Tourism, History etc. '*Gita*', '*Ramayana*' and Jai Shankar Prasad's '*Kamayani*' are the best examples of this because philosophy, psychology, culture, mythology go together in a synthetic form. For example, the English word 'alienation' in the field of Psychology is mental instability, mental dementia, Insania etc. is used in forms. Baldwin in his 'Dictionary of Philosophy and Psychology' has used the term in its purely medical sense - 'alienist' - which means specialist in the study of psychiatric diseases. In the modern era, the study of mental instability is done under the Department of Psychiatry and not in the Department of Medicine. Use of the same word 'theology' or in 'spiritual philosophy' in the sense of the person's alienation from God (separation). In the first half of the last century, instead of using the word 'alienation' at an impersonal level, it was used for coldness or disintegration in personal relationships. At the socio-cultural level, it is used in the sense of 'strangeness in affection-relationships'. Thus it is clear that philosophy, psychology, spirituality, society, culture etc. are often used in a synthetic form.

(iii) Reference to thematic and stylistic communication : Although in any kind of literature of knowledge, it is necessary that thematic and stylistic communication should be maintained in the translated text, however, in the translation of philosophical-psychological literature, both thematic and stylistic successful-communicative expression in the target language is required. The point to be noted here is that successful, smooth, natural, comprehensible, clear translation does not mean that in order to maintain these in the translated text, any kind of compromise is made with the meaning, content or factual authenticity of the original to be taken. If this is done, then on the one hand it will adversely affect the readers of the target language and on the other hand the basic purpose of the creation of the source language will not be fulfilled. The effort of the translator should be that while bringing the facts/thoughts/expressions of the original in the target language, as far as possible, a touch of artistry can also be included in it so that the translated text does not appear to be just a translation.

5.9 Let Us Sum Up

In this unit, you have gained detailed knowledge about thematic classification of the entire literature, understanding the meaning and nature of Humanities literature. You have also learned about the prerequisites for translation of Humanities literature. First of all, it is important that what is the criterion of success in translation, what are the language-texts in the context of translation, what methods are adopted for those language-texts. In this context, you have come to know that in the translation of Humanities literature, the method of word-for-word translation and sense-for-sense translation is adopted.

While getting information about what are the characteristics of Humanities literature, you came to know that it lays special emphasis on the qualities of factuality, informativeness, clarity, comprehensibility, objectivity, non-decorativeness etc. It is important for the translator to be aware of these features. On the basis of his own understanding, s/he can maintain these characteristics in the translated text. In this unit you also learned the difference between Humanities translation and literary translation. Now it must have become clear to you that in Humanities translation the subject-matter is major and the style is secondary while in literary translation both the subject-matter and the style are important.

In the present unit, the semantic and stylistic problems related to languages and linguistics have been highlighted considering various aspects related to the translation of Philological Humanities literature. Similarly, various dimensions of translation of Contemplative Humanities literature related to Philosophy and Psychology were also discussed. And you noticed how the translation of Philosophy and Psychology subjects is a little different from the translation of other subjects in the Humanities. Obviously, the translation of philosophical and psychological literature differs from the translation of other subjects only because of the complexity, depth, intricacy, complexity, subtlety etc. of the meanings.

In the next unit you will study about translation of Social Science literature.

5.10 Exercises

1. Explain the meaning and nature of literature relating to Humanities.
2. State the prerequisites for translation of Humanities literature.
3. Explain with examples the difference between translation of Humanities and Creative literature.
4. Throw light on the problems of translation of Philological Humanities literature.
5. Discuss the problems of translation of contemplative Humanities literature.

5.11 Suggested Readings

- -----, 1992. Comprehensive Glossary of Technical Terms (Humanities and Social Sciences Volume- 1), New Delhi, Commission for Scientific and Technical Terminology.
- Gupta, Neeta et.al.(Eds.), 2001. *Anuvad Shatak*, Vol.-1, New Delhi, Bhartiya Anuvad Parishad.
- Singhal, Suresh, 2006. *Anuvad : Avdharna Aur Aayam* (Translation: Concept and Dimensions), New Delhi, Sanjay Prakashan.

- Tiwari, B.N. (ed.), 1986. *Vaigyanik Sahitya Ke Anuvad Ki Samasyaen* (Problems of translation of Scientific literature), Delhi, Shabdkar.
- Tiwari, B.N. and Kiranbala (Eds.). *Bhartiya Bhashaon Se Hindi Anuvad Ki Samasyaen* (Problems of Translation from Indian languages to Hindi), New Delhi, Shabdkar.
- Iyer, N. E. Vishwanath. *Anuvad : Bhashaen-Samasyaen* (Translation: Languages-Problems), Delhi, Gyan Ganga.



Unit 6 Translation of Social Sciences Literature

Structure

- 6.0 Objectives
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- 6.3 Difference Between Natural Sciences and Social Sciences
- 6.4 Language of Disciplines of Social Sciences
 - 6.4.1 Characteristics of Language of Disciplines of Social Sciences
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 - 6.5.1 Competency in Source and Target Languages
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 - 6.7.3 Problem of Selecting Appropriate Word
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 - 6.7.5 Translation of Social Science Text : Historical-Cultural Context
 - 6.7.6 Translation of Proper Nouns
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 - 6.7.8 Problems of Translating Signs, Symbols, Equations etc.
 - 6.7.9 Use of Idioms and Proverbs
- 6.8 Let Us Sum Up
- 6.9 Exercises
- 6.10 Suggested Readings

6.0 Objectives

After going through this unit you should be able to:

- know the meaning, nature and scope of Social Sciences and understand its difference from Natural Sciences;
- understand the characteristics of language of disciplines of Social Sciences and compare it with the language of Natural Sciences;
- know the prerequisites for translation of Social Sciences literature and its difference from translation of creative literature; and
- learn about some of the major challenges faced by the translator during their translation.

6.1 Introduction

In the last unit, you have read about translation of Humanities-related literature. In that, you learned that what are the major disciplines included in Humanities literature and what kinds of problems are encountered in their translation.

This unit deals with translation of Social Sciences literature. The study of human-society is the centre of Social Sciences, under which mainly we study disciplines like Economics,

Sociology, Political Science, History etc. Due to its connection with man and society, this knowledge-text has become an essential part of our society. Translation works as a main means to introduce other language-speakers to this cognitive literature. Therefore, translation has a special role in the field of Social Sciences. Recognizing this importance and role of translation, it is also given prominence in the major areas related to translation.

In the present unit, after acquaintance of meaning, nature and disciplines of Social Sciences, we are highlighting its difference from Natural Sciences and its linguistic features. After that the need and importance of translation of Social Sciences literature is underlined. In this context, the prerequisites and the problems faced by the translator have also been discussed in the light of this topic so that the translator can become familiar with the various dimensions of translation of knowledge-text related to Social Sciences.

6.2 Social Sciences : Meaning, Nature and Scope

From the term ‘Social Science’, ‘Science’ means - ‘Special Knowledge’. Science is broadly seen in terms of ‘Nature’ relating to matter and animal world and the activity of ‘human beings’ as a group. Science concerned with nature is also known by the term ‘Natural Sciences’, ‘Physical Sciences’ or simply ‘Science’. Special knowledge of land, sky, animals, trees and plants, soil, rocks, mountains, rivers, springs, space, metals, gases etc. can be the disciplines of study of ‘Science’. From this point of view, Science is mainly classified into sub-disciplines like ‘Physics’, ‘Chemistry’, ‘Mathematics’, ‘Biology’, ‘Botany’ etc. But these disciplines of Science do not remain confined to their field of study but keep encroaching on the branch of other area of study. The result of this type of encroachment is that two or three branches of Science together give rise to a separate branch of knowledge. Examples of sub-disciplines are Engineering, Bio-technology, Computer Science, Medical Science etc. You will study about the branches of Science in Unit 7.

When Science is seen in the context of ‘human’ activity, it becomes a discipline of Social Sciences. In the Encyclopaedia of Social Sciences, ‘Science’ is divided into two categories, one of which is related to ‘Natural Science’; and the other from ‘Psychological or Cultural Science’. The second of these i.e. mental or cultural science, is further divided into two categories - (a) that in which man is seen as a separate individual from society; and (2) one in which the individual is seen as a member of society. In the area of knowledge like ‘*Tarkashastra*’ (Logic), man is seen as a separate person from the society. The second type of science (i.e. mental or cultural science) covers various aspects related to human society and social life. These aspects can be related to politics, economic as well as historical.

Social sciences is the science concerned with the study of society. The Science which analyzes and classifies group activities by considering the individual as a part of the society is called a Social Sciences. According to the ‘Encyclopaedia of Social Sciences’, ‘The Social Sciences may thus be defined as those mental or cultural sciences which deal with the activities of the individual as a member of a group.’ Hence, when viewed knowledge in the context of science, that discipline of knowledge becomes a Social Sciences. However, some scholars also talk of ‘quasi-Social Sciences’ and include areas of knowledge such as ‘Ethics’, ‘Philosophy’, ‘Education’ and ‘Psychology’ etc.

Social sciences are concerned with the study of society and its influence on the way people behave and on the environment. Society is a link of social relations. Human relationships are needed to build a society. Social relations are formed when each person accepts and behaves with each other. For example, the behaviour of students standing in respect when the teacher enters the classroom actually reflects the social relationship between the teacher and the

student. The relationship of one person with another is the basis of the formation of society. The development process of building society is 'Individual → Family → Community → Society' i.e. a person is born in a family and different families come in contact with each other to form a community. The relationships and interactions between different communities give rise to any society. But this society-like structure of social relations is not simple but complex in which both mutual cooperation and conflict of people exist. Social science is helpful in studying and understanding such relations existing in human-society.

Man has to fulfill some needs in order to live and earn his living. He can meet some of these needs without any help. But most of his needs are such that they are 'similar' in nature or cannot be met by themselves alone. These requirements are of various types. To fulfill these needs, it is necessary for human beings to make collective efforts. Such efforts become 'group activities' (or it can be said that 'social activities'). The branch of knowledge in which these activities are studied and analyzed is called 'Social Sciences' in its broadest sense. Disciplines-areas like Political Science, History, Economics, Sociology, Anthropology etc. are included in the purview of Social Sciences.

Social life has become very complicated in today's era. No single discipline or subject-area can make a comprehensive study of it in depth. When various activities of the society are studied for a particular purpose and in a particular scope, according to that the types, branches and sub-branches of Social Sciences keep on forming. Each of these social disciplines focuses on a particular aspect of society. The main thing is that all the branches and subjects of Social Sciences are related to the behaviour of people, but in each of these branches/subjects different aspects of people's behaviour are studied. For example, discipline of 'Economics' studies the economic institutions of society while discipline of 'Sociology' studies social groups, communities and institutions to understand social life. Similarly, political institutions of the society are studied in 'Political Science' discipline.

The scope of Social Sciences is very wide. In this, Political Science, History, Economics, Sociology, Archeology, Cultural Studies, International Studies, Social Work, Development Studies, Informatics, Administration, Library Sciences, Demography, Political Economics, Business Economics, Communication/Communication Studies etc. various subject areas or disciplines are mainly included. Apart from this, subjects such as Media Studies, Journalism, Management, Environmental Studies etc. are also included in the broad scope of Social Sciences.

However, the fact cannot be denied that the above mentioned subject areas/disciplines of Social Sciences are not only related to this. The fact is that some disciplines, apart from the Social Sciences, are also partly related to the 'Humanities' and 'Natural Sciences'. For example, the discipline 'Physical Anthropology' of Anthropology is closely related to the Zoology branch of Natural Sciences while 'Cultural Anthropology' or 'Social Anthropology' is more related to the Social Sciences. Similarly, the branch of Psychology 'Social Psychology' is related to Social Sciences and 'Clinical Psychology' is related to Medical Sciences. In the context of Geography itself, 'Human Geography' is related to Social Sciences and 'Physical Geography' is related to Physics and 'Geophysics' of 'Natural Sciences', whereas 'Environmental Geography' includes both 'Human Geography' and 'Physical Geography'.

In a formal education, degrees are awarded by universities in the field of Social Sciences. Universities in India offer undergraduate and postgraduate degrees in various subject areas in the Social Sciences. But the point to be noted is that these titles are given a place in the Faculty of Arts. For example, a 'Bachelor of Arts in History', an 'M.A. in Sociology', 'M.A.

in Political Science’ etc. While in many universities abroad, degrees of ‘Bachelor of Social Sciences’ are also given. Now in India also degree programmes have been started in a particular discipline of Social Sciences like ‘Bachelor of Business Economics’, ‘Bachelor of Business Management’ etc.

6.3 Difference Between Natural Sciences and Social Sciences

Science is the systematic study of any particular subject. It is a set of principles and established knowledge that has the ability to explain each related phenomenon in a particular field. This is possible because it emphasizes observation and verification of phenomena. The thing to note is that those rules are so solid and permanent that predictions can be made based on them. Thus, accuracy, certainty, validity and predictive ability are considered essential elements of Science. This systematic study involves systematically observing a phenomenon (observation), objectively considering the observed things; and making predictions. On the basis of this basic information, we can differentiate Natural Sciences and Social Sciences :

- Natural science deals with the study of both living and non-living matter, while Social Sciences deals with the study of human behaviour. Study-analysis of human behaviour is not possible as easily as that of physical objects.
- Man is the centre of all social processes. Man plays a major role in all kinds of social events. But they cannot be studied with the same rigorous accuracy as physical phenomena. Studies in the Natural Sciences show that action and reaction are equal and opposite, for example, hitting a ball at a wall is an ‘action’ and the ‘reaction’ is seeing the ball come back. Similarly, according to Chemistry, if the process of mixing hydrogen and oxygen is done, then its reaction will be that water will be formed – $\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$. Whereas, in social contexts, the rules of this type of action-reaction do not apply equally. For example, if an elderly person slaps a child, then the child will not take any action as a reaction. Here, the principle of Natural Sciences becomes ineffective that ‘action and reaction are equal and opposite of each other’. Thus, it can be said that the level of pure accuracy that can be achieved in the Natural Sciences is not possible in the field of Social Sciences.
- The Social Sciences cannot produce such results with such certainty as the Natural Sciences do. For example, in Chemistry, the combination of different chemical elements gives definite results. (like, $\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$) but no principle has been made in the Economics to make a person or nation economically prosperous.
- In general, no Social Sciences can claim the pure accuracy that it is capable of predicting. But this does not mean that it is impossible to develop rationally valid rules about human behaviour. For example, Sigmund Freud’s contribution to Psychology cannot be ignored. On the other hand, it is not necessary that all theories in the field of Natural Sciences are so-called definite. Due to the revelation of new facts and new discoveries, changes have also had to be made in them. For example, in Physics, the ‘Corpuscular Theory of Light’ was replaced by the ‘Wave Theory’. Similarly, the ‘Theory of Relativity’, ‘Theory of Motion’ and the ‘force of gravity’ were modified from many previous assumptions.
- Natural Sciences are relatively less complex. The studies done here can be universally applicable. Scientific facts are universal in themselves, but social facts cannot be said to be universal. The area of study of Social Sciences is the social world, which is quite complex. Every human society has certain rules of its own, whose results are not

uniform. We can understand this dimension of difference with the help of an example. For example, the Earth revolves around the Sun in its orbit and on its axis. The Earth revolves around the Sun in 365 days and around its axis in 24 hours. This is a universal fact and is beyond the limits of space and time. But social facts are not the same in all societies, they differ from society to society. For example, the worship of cow in Indian Hindu society is a social fact, while the eating of its meat by western society is also a fact.

- Scientific facts are beyond the limits of time; while social facts keep changing according to the country and time. For example, 'child-marriage' or 'tradition of sati' were prevalent in India in some era, but today these are legally offenses in India.

However, in spite of these dimensions of difference, there is no doubt that Social Sciences and Natural Sciences can be said to complement each other. Science and Natural Sciences do not pursue each other's opposing goals. The Natural and Social Sciences are related to each other in the sense that they aim at the search for truth. Today Social Sciences has adopted that creative thinking method of Science. According to this method, the rules of validity and verification are expected to be followed in the observations. On the other hand, in Natural Sciences also the aspects of human values, meanings and their thoughtfulness is being considered. The focal point of various Natural and Social Sciences is 'human' and 'desire for human welfare'.

6.4 Language of Disciplines of Social Sciences

The language of Social Sciences takes a special form. This feature of language can be seen at the level of vocabulary, expression and sentence-style. Specific terminology and specific expression-style help in giving technical form to the content of Social Sciences. The amount of technicality in it is less as compared to the language of scientific material. From this point of view, where it is necessary to consider the specialty of the language of Social Sciences disciplines, it is also necessary to throw light on its difference from the language of Natural Science disciplines. Let us first consider the characteristics or features of language of disciplines of Social Sciences.

6.4.1 Characteristics of the Language of Disciplines of Social Science

As it has been said that the language of Social Sciences has a specific form. This feature can be understood on the following grounds – (1) denotative language, (2) simple-clear language, (3) lack of figurative expressions, (4) objectivity, (5) narrative, (6) use of special symbols and diagrams; and (7) use of abbreviations.

(1) Denotative Language:

The language of Social Sciences literature is conceptual. This literature is written in a duplex-free language. The meaning of duality or connotation is - whatever is being said or written through language, it has a direct meaning. There is no ambiguity in the meaning expressed by him. If this literature is written in a denotative or sarcasm words and expressions, then the readers will not be able to understand the necessary information clearly. While providing necessary information related to the domain-specific to the readers is a special quality of this language. Therefore, the literature on Social Sciences is the literature written in an denotative language. For example, consider the following quote from the topic History of the Social Sciences:

Technological changes that took place in the 11th and 12th centuries changed the face of Western Europe. The growing population spread to uninhabited parts of Europe. He expanded the cultivable land by clearing forests and pastures. This

movement of land-expansion was particularly strong in the 12th century. Initially, this work was started by small farmers at individual level. Later, the zamindars also joined in this work and gave it an organized form. Due to less demand for labour and increase in population, agricultural slaves were also freed from the compulsion of being tied to the land. Instead, they used to pay transfer fee to the zamindar.

(2) Simple and clear language :

Literature on Social Sciences is written in simple and clear language. Simplicity- clarity is an essential quality of its language. It helps in making the presented content easy and communicable. Since the information related to Social Sciences is given in denotative language, its language does not contain unnecessary elements like figurativeness. It is also important in determining the ease and complexity of the language of giving subject-related information, which is its target audience? Is he a primary school student or secondary or higher secondary level or higher education student or research scholar/subject specialist? The level of simplicity of language is also from bottom to top i.e. simplest for the lower classes and lesser simple for the classes above that. For example, consider the following quote from a sixth grade textbook :

The short story 'Swavalambi' inspires to do one's own work. Often children hesitate to do small household chores. They only feel that their friends will make fun of them when they see them working. On Sanjay's advice, Rinku realizes that the same thing is taught in school to be self-reliant. Now he does not hesitate to do any work.

The noticeable point is also that the scale of linguistic simplicity is also not the same. For example, Bangla and Hindi languages have different scales of language ease.

(3) Lack of Figurative Expressions :

Figurativeness has been considered a special quality of literary language, but there is a lack of figurative expressions in the language of Social Sciences literature. Social Sciences related information is given in denotative language, so its language does not include figurativeness. For example, consider the following quotes on the subject of history:

In the early feudal system, a large number of labourers worked to provide a life of luxury to a small class of landlords. Agriculture was the main means of production in this system. At that time the state of agriculture was such that a large number of labourers were needed. Due to excessive demand for labour, such a situation arose that the labourer remained tied to the agricultural land. He could not leave the land and go anywhere else. In return, there was assurance of security and livelihood for him and his family. This situation continued till the end of the tenth century.

(4) Objectivity :

Objectivity is the most important quality of the language of Social Sciences, while subjectivity is the specialty of literary language-style. Subjectivity means - depending on the person's feelings and thoughts instead of external things. Subjectivity can be reflected in a person's common speech or in literary works because it is the expression of a person's own feelings and thoughts, whereas objectivity is based on the observation and analysis of physical objects or external objects, facts and events etc. There is no place for any kind of bias or personal opinion of the author in objectivity. Thus it can be said that subjective expressions are not used in the language of Social Sciences. Objective expression of knowledge takes place due to the objectivity of the language-style. This increases the credibility of knowledge. Therefore, it is necessary to be objective in the language-style of

knowledge-literature including Social Sciences. Objective language-style includes essential information in denotative language. The special thing is that there is no place for unnecessary elements in it. For example, see the following material on the subject of Economics:

In India, it has been observed that the size of households with large holdings in villages is also large. This is because the tradition of joint family is still prevalent in India. One reason for this is also that when there are relatively large holdings and cultivation is done by the family members themselves, then more labour is required in them. Generally they do not want to divide the family's landed property because more landed property gives them higher status in the villages. Therefore, families believe in big family to cultivate their fields. From this they get that manpower which is also helpful in the current socio-economic system of the village.

The determination of simplicity or complexity of the language of expression of knowledge also depends on the level of the reader. If knowledge-text is for young children or children in the younger classes, it will necessarily be simpler and relatively less simple for adults. For example,

The textile industry was very developed in India from very ancient times. Indian cloth used to go to far-away countries. Silk cloth has also been made here for a long time. But it was probably not as good as Chinese silk, which was imported here in 200 BC. It was done from the 4th century onwards. The Indian silk industry developed later, but not much. Remarkable progress was made in the art of dyeing cloth and special methods of preparing fast colours were discovered. One of these was the colour of indigo. The word is derived from India and came into English via Greek.

(5) Narrative :

The language of Social Sciences is of narrative form. The reason for this talkativeness of language is its subjective language-form. Its linguistic form is not an expression of the personal choice of the sociologist or his personal point of view. In it the social fact expressed by the sociologist is revealed. On the other hand, if we consider the language of creative literature in this context, then it can be said that it has speaker-oriented, it expresses the personal choice, interest, attitude of the creator. Therefore, the language form of creative literature is considered to be emotional while the language form of Social Sciences is narrative because of its subjectivity. Consider, for example, the language and implicit rhetoric of the following Social Sciences material:

The process of planning and development has contributed to major changes in the cultural and social life of the Indian society. Industrial progress, urbanization and social mobility are the results of this. They have encouraged the forces of cultural modernization. There is a close relationship between urbanization and social mobility. There was little scope for social mobility in the traditional Indian society. Similarly there was a slow process of urbanization. Most of the cities had a pre-industrial appearance. Industrial work was carried out by hereditary division of labour based on caste and guild organizations. Most of the cities existed because they were places of pilgrimage or the capital of the ruling class. These cities (which were complex in social organization, centres of trade and commerce and professional classes) preserved traditional values, cultural practices, social and economic patterns. In the social organization of traditional Indian society, the city represented the cultural dominance of a particular class. There was a lot of

cultural innovation, but due to social and economic stability, there was almost no variation or difference in forms. The pace of technological innovation in the economic and social functioning of cities was relatively slow. The means of trade and transport, the sources of energy and the division of labour were fixed and because of this the pace of social change was slow.

(6) Use of special Signs-Symbols and Diagrams:

The use of special signs or diagrams is also a special feature of the language of Social Sciences, which appear in the form of signs and symbols etc. They are used to express a special intention. By the use of these special signs and diagrams etc., which show the brief form in their shape and type, there can be a comprehensive expression of the intention expressed through the language. Although these types of special symbols are used relatively more in science literature, they are especially used more in Economics and Statistics, a branch of Social Sciences. In the subjects of Economics and Statistics, a lot of use of these signs and symbols etc. can be seen in the form of tables, diagrams etc. For example,

$$\text{Dependency Ratio} = \frac{\text{Number of Dependants}}{\text{number of working persons}}$$

Similarly, look at another example:

Social science studies or analyzes society in the following directions :
 Slavery → Feudalism → Capitalism or Socialism.

In the above example, the arrow symbol is used, which has become a means of expressing the idea in fewer words and more meaningfully and hierarchically.

The use of formula-equation etc. is also included under similar special signs. Formulas, equations etc. are used to represent many principles, concepts and relationships. Their special use can be seen in the discipline of Economics of Social Sciences. Roman characters are used in these formulas and equations. For example, writing $Y = C + I + G$ for the concept of aggregate income or writing $MPC + MPS = 1$ for the relationship between consumption and saving propensities. If you look at their usage in Hindi language, you will find that Roman letters are often used for them.

(7) Use of Abbreviations :

Abbreviations are the aspect of human psychological nature. This is the dyotak of human 'linguistic economy'. Abbreviations can be seen used in any type of literature from common speaking. They are also used a lot in Social Sciences and especially in subjects like Economics. In this, where Mathematical formulas, diagrams, sketches, geometric shapes etc. are used, relatively more use of abbreviations can also be seen. There is no doubt that the use of abbreviations facilitates in rendering the content of the subject. Using abbreviations makes meaningful expression possible with fewer words. Language is advanced and refined by the use of fewer words and the expression of appropriate meaning. This brings agility and tightness to the language. Abbreviations prevent wastage of time and energy. GDP, GNP, NDP, NNP, VAT, FDI etc. abbreviations can be seen specially used in Economics. In the same way, the names of many institutions/organizations like WTO, WHO, G-7, G-15, G-20, GATT, SAARC, EEC, OPEC, UN, UNESCO, UNCTAD etc. related to the economic-political world are often mentioned in short form only. Apart from this, you have been told that mathematical formulas, diagrams, sketches, geometric shapes, axes etc. are used in Economics. They are used to explain economic principles. They are shown in common English letters and symbols only. For example, 'P' - for the supply curve, 'D' - for demand curve; AR - for average income curve; MR - for marginal revenue curve etc.

After knowing the features of the language of Social Sciences related material, let us now consider its difference from Natural Sciences related text.

6.4.2 Language of Natural Sciences and Social Sciences Subjects : Difference

You will study in detail about the language of Natural Science subjects in the next Unit No. 7 of this course. Here only its difference from the language of literature of Social Sciences subjects is being underlined.

You have read in Section 6.4.1 of this unit that the language of Social Sciences subjects is simple, clear, narrative and denotative. There is no place for figurative expressions in it, nor are subjective expressions used. The use of special symbols/diagrams and abbreviations is a special feature of its language. All these qualities are also present in the language of Science. But does it mean that both have the same language. On considering this, we find that despite these points of similarity, there are dimensions of difference between these two because of the knowledge literature. The points of difference prevailing in both are as follows :

- From the point of view of expression, it can be said that the language expression of Social Sciences is of technical form, but the amount of technicality in it is less as compared to the technicality of the language of scientific material. In language, this technicality takes its shape from the combination of several components such as words, specific expressions or sentence forms, and textual compositional methods. It definitely becomes technical from the sociological point of view. For example, see the following excerpt from an article on Economics on the country's economic progress :

The continuous increase in the total production capacity of an economy over a period of time is called 'economic growth'. Economic growth is generally measured by the rate of growth of Gross National Product (GNP). GNP is a measure of the total output of goods and services in an economy.

- The concepts of Social Sciences subjects are not entirely new as compared to other science subjects. Concepts in Social Sciences disciplines are often related to familiar contexts and terminology. Many times it is also seen that in order to express the concept within Social Sciences subjects, the ambient (familiar) vocabulary itself is stereotyped in new contexts. For example, see the following examples of Sociology and Social Transformation, including 'development', 'participation', 'economic status', 'illiteracy', 'social barrier', 'caste barrier', 'committed bureaucracy', familiar terms like 'political leadership', 'communication technology', 'organisational problems' are used :

There is no disputing the importance of popular participation in achieving the goal of development, yet there are many hindrances in it. Low economic status of the people, widespread illiteracy, social and caste barriers, lack of committed bureaucracy and political leadership, lack of communication technology and organizational problems are some of the major problems hindering the participatory method.

- Due to specialization in a particular branch of science, the scope of the subject becomes very limited. But there is no clear boundary between the branches of Social Sciences. Some subjects related to these branches are of the same type. The fact of the matter is that more or less all the branches and sub-branches of Social Sciences often come out of the periphery of their subject area and come in the areas of other branches and sub-branches. For example, both sociologists and economists of Social Sciences can study 'industry' at the subject matter level in their respective fields of study, but the objective and method of study will be different.

- Apart from the content, different subjects of Social Sciences influence each other from the point of view of language also. The fundamental basis of this effect of language is vocabulary and not sentence-structure. Therefore, there is some level of similarity in the prevalent terminology of Social Sciences. There are many reasons behind this similarity of terminology. For example, the formation of vocabulary from different ideologies, activities and movements; vocabulary emerged through the ideas propounded by social thinkers in relation to various subject-areas of social, political, economic etc. Social Sciences in different periods; and on the basis of the principles, ideologies, concepts, inspirations, rules etc. built on the basis of those ideas, practice of many types of 'opinions' and 'promises' (imperialism, liberalism, capitalism, nationalism etc.).
- As stated above, the concepts of Social Sciences subjects are not entirely new as compared to science. It pervades our society, but they are given literal expression. The words in which they are expressed are our familiar vocabulary, but many times it is stereotyped in new meanings. For example, read the following material on Social Sciences carefully:
 - (a) An economy where both the government and the private sector work together and participate in developmental activities is called a mixed economy.
 - (b) The state which is neither included in the camp of western capitalist countries nor in the camp of communist countries, is called non-aligned state.
 - (c) Urbanization is the process of becoming urban. Urbanization in general practice is accompanied by the concentration of population in towns and cities. Urbanization as a demographic phenomenon is defined as a process that involves the absolute and relative growth of towns and cities in a given area, usually in a country (due to the reliance on census data). Urban areas, especially large cities, are considered centres of social change. According to the size, density and heterogeneity of the residents of the urban area, their impact falls on the attitudes, values and behaviour of the people of other areas. The characteristics of an urban area spread to the rest of the society or country. But this is not necessarily the case in countries with a colonial legacy.
 - (d) Ethos is those norms which are considered by the community to be of great importance and are essential for well-being of the community. Violation of ethos triggers an emotional reaction and triggers a strong collective action. For example, the prohibition of beef is a part of the ethos of Hindu society. Its violation is not tolerated.

Looking at the above examples, you must have found that in Example-A 'economy', 'government', 'private sector', 'mixed economy'; Example-B's 'state', 'capitalist country', 'communist country', 'Non-aligned state' etc. are familiar words, but they convey a special technical meaning. Similarly, in Example-C 'urbanization', 'demographic phenomenon', 'census', 'social change', 'values', 'colonial legacy', and in Example-D's 'ethos', 'paradigm' etc. familiar words used in a technical sense can be seen.

- The use of sign language is relatively more in science related material. This is especially high in material related to subjects like Physics, Chemistry and Mathematics. For example  Whereas in most of the subject areas of Social Sciences, the use of sign language is relatively less. There are some subject areas

of Social Sciences like Economics and Statistics in which the use of this type of sign language is seen, but mostly such language is rarely used.

In fact, Social Sciences and Natural Sciences have their own special role in making the society knowledgeable.

6.5 Translation of Social Sciences Literature : Prerequisites

Translation of Social science literature is not much different from general translation, but there are certain aspects that are taken into account while translating Social Sciences content. These aspects can be called the prerequisites of translation of Social Sciences literature. Let us now consider these prerequisites.

6.5.1 Competency in Source and Target Languages

The translator of any kind of literature including Social Sciences should have requisite command over the source and target languages. In the absence of requisite authority on both languages, he cannot translate because during translation basically the text of one language is presented in an understandable form in another language. But it is not an easy task to express the expressions expressed in one (source) language in another (target) language. The basic reason for this is that each language originated and developed in its own specific environment, it has its own linguistic idioms. This linguistic specificity includes the own phonetic, lexical and syntactic arrangements and structures related to idioms-proverbs etc. of that language. Apart from this, it also has many stylistic differences of its own. Therefore, in order to understand the feelings-thoughts expressed in a language (source language) in oral or written form, the translator should have authority over that language, only then he will be able to understand the content expressed in it.

Since each language has its own unique linguistic structure, it is but natural that there is little chance of semantic similarity between the linguistic forms of the source and the target language. The translator has to understand the stylistic differences of each language and try to convey the characteristics of the text generated from it in an understandable form in the target language. It is meant to say that the translator is required to adapt the word-scheme, phrases, idioms and synonyms etc. of the source language to the nature of the target language. Therefore, he must have the requisite command over the second language (i.e., the target language) as well. If the translator does not have authority over the target language, then he will not be able to present the text of the source language in an understandable form according to the nature of the target language. The word-scheme and syntax etc. of the target language should be grammatically appropriate and should be able to give an accurate understanding of the original text. If each sentence is complete in itself and easily related to the other sentence, then it brings ease and cleanliness in the language, the language becomes fluent. In order to maintain mastery over the source and target languages, the translator needs special means of translation in the form of dictionaries of both the languages. In fact, on the strength of authority over the source and target languages, a proficient translator is able to complete the challenging task of translation well.

6.5.2 Understanding Different Subject-Areas of Social Sciences

The translator needs to have an understanding of the different subject-areas of Social Sciences, as translation of Social Sciences subjects is mainly interdisciplinary nature. In Section 6.2 of this unit, you have already been told that some subject areas, apart from the Social Sciences, are partly related to 'Humanities' and 'Natural Sciences'. For example, 'Physical Anthropology', the sub-branch of 'Anthropology' is closely related to the Zoology

branch of Natural Sciences and ‘Cultural Anthropology’ or ‘Social Anthropology’ is more related to Social Sciences.

We can explain this fact with the help of an example. The study of ‘Language problem of specific society’ covers under ‘Socio-linguistics’, which is basically a subject related to ‘Humanities’, while study of social institution (like family, marriage, kinship etc.) of that particular society is related to ‘Sociology’. And if it is a tribal society, then the study of their language and social institutions would come under ‘Social Anthropology’.

The inter-disciplinary dimension of Social Sciences is also seen to be related to different branches of study areas (i.e. its branches or sub-branches). For examples, ‘The Study of Democracy’ is associated with Political Science branch of Social Sciences. But in this study, when the development of democracy will be discussed, then at that time, a lot of material from ‘History’, another branch of Social Sciences, will have to be used. And if in this topic (i.e. ‘Study of Democracy’) of Political Science, if it has to be determined that to what extent democracy has been successful in achieving its goal, then for this, somewhere associated with related subject may also have to be resort to Economics material. Similarly, if the status of women is considered from a sociological point of view, then we have to keep in mind that their status has other contexts also, like so-called ideals-values-norms-taboos created by the society for economic development, political participation and other conduct.

Due to the inter-disciplinary nature of Social Sciences, there is bound to be a lot of use of terminology from other sub-discipline areas of the social sciences within the content of a related subject. Therefore, it is necessary for the translator to have general knowledge of many subjects of Social Sciences. He cannot engage himself in translation work by confining himself to any one subject. In the translation of this type of material, the translator has to adopt an integrated approach.

6.5.3 Understanding of Technical Terminologies of Various Areas of Social Sciences

Due to the interdisciplinary nature of Social Sciences, it is necessary for the translator to have knowledge of its many sub-disciplines as well as understanding of the terminologies of all those sub-disciplines. For example, we can take the English term ‘yield’. If the translator were to refer to the noun form of this word with various synonyms (i.e. (1) ‘yield’, ‘production’, ‘yield’ (2) ‘receipt’, ‘income’; and (3) ‘reward’ and verb forms (i.e. to bow ' or 'give up'), then he can make a terrible mistake while translating. Therefore, it is also necessary for the translator to have a sense of word selection according to the context.

Just as the translator cannot limit himself to a particular study area of Social Sciences, in the same way, he cannot engage in translation work only by using the technical terminology of a particular subject of Social Sciences. It becomes necessary to use the integrated terminologies of Social Sciences and Humanities subjects. Realizing this need, the Commission for Scientific and Technical Terminology, Government of India, has prepared and published such a consolidated terminology. Keeping in view the usage of a particular word in different branches of Social Sciences, the commission has also prescribed different words and they have also been mentioned in this glossary.

6.6 Translation of Social Sciences Literature and Creative Literature : Difference

In this part of the unit, we would like to differentiate creative literature from Social Sciences literature so that you have a clear idea of what is expected of a translator in both these

disciplines. The points of difference prevailing between these two can be expressed as follows :

- Social science content has a different language form than literary language. It can be separated on the basis of selection of word, use of specific types of expressions, syntactic style as well as the mode of message presentation.
- The language of Social Sciences literature is technical (definitional), so practical and proper use of technical language is made in its translation. In contrast, the language of literary works is creative. Therefore, special care has to be taken towards creative expressions in the translation of literary text.
- There is a touch of artistry and eloquence in the language of literature. It is the responsibility of the translator to preserve this in the translated text. For this, he mostly takes the help of translation or free translation and reconstructs the original message in the target language on the basis of imagination and creative style. The test of translation of literature is to produce the same taste in the target language that the original word produces in the source language. Whereas, during the translation of Social Sciences literature, the message of the source language is presented in the target language, and not re-created in the target language.
- While translating Social Sciences literature, it is necessary for the translator to have an understanding of its various subject-areas and their technical terminologies, while the translator doing literary translation must have creative talent.
- Translation of Social Sciences literature is objective and macro in its nature, while subjectivity and subtlety have to be maintained in literary works.
- If the language of any composition related to Social Sciences is observed, then it can be said that it is a language rich in denotative word-power i.e. whatever is being said in it, it has the same meaning. On the other hand, in literary language, along with denotative meaning, the words denotative and sarcasm are examples of word-power language. Therefore, translation of Social Sciences literature is denotative and literary translation is connotative and sarcasm.
- In literary language there is a wide range of options, whereas in Social Sciences language there is more or less a fixed method of describing social phenomena. In other words, the translation of Social Sciences literature is often monosemy expression and the literary translation is polysemy expression. Therefore, translations done by many translators of literary works and especially poetry texts are visible. However, this is rarely seen in the translation of Social Sciences literature. To make this clear we may mention some examples. For example, we can find from the example of Nobel prize winner Gurudev Rabindranath Tagore's '*Gitanjali*' that there are more than 100 poetic translations in Hindi alone. Similarly, many litterateurs like Maithili Sharan Gupt, Keshav Prasad Pathak, Sumitra Nandan Pant, Harivansh Rai Bachchan etc. have translated the Poetry of Omar Khayyam into Hindi by Fitzgerald's English translation of '*Rubaiyat of Omar Khayyam*'.
- In literary works, due to the connotation and sarcasm, they contain synthetic semantic images, which are a challenging task for the translator. At the same time, the abundance of non-syntheticity in Social Sciences literature makes the translator's job easier.
- While translating Social Sciences literature, translators give priority to the lexical meaning of the source language text. On the other hand, contextual meaning is promoted

by the literary translator. In Social Sciences literature, basically the expression of information, idea, and concept gets a place. Therefore, the content of the source language text is transferred to another language, while in translating creative literature, the literary translator recreates the culture of the source language text in the target language.

- In creative literature, along with the content element, style also has special importance. so literary translator gives equal importance to both these aspects, whereas in Social Sciences literature, subject matters and the style are secondary. So the translator also gives importance to the subject and there is no special emphasis on the style.
- While doing literary translation, it is not so important for the translator to present the original text as it is and the facts/message contained in it, as it is necessary in translating Social Sciences literature.
- Maintaining fidelity to the original is essential for the translator of Social Sciences literature as it emphasizes on originality while in literary translation the translator prefers free translation, sense-for-sense translation or translation of meaning. Poetry-elements (like emotion, image-symbol, myths etc.) are in abundance in creative literature, while facts etc. are used in Social Sciences related literature.
- Due to the emphasis on originality, the Social Sciences literature has a slightly higher proportion of word-for-word translation and less of sense-for-sense translation. On the other hand, literary translation has a very low proportion of word-for-word translation as compared to sense-for-sense translation.
- If seen from the elemental point of view, classical elements were given importance in the translation of Social Sciences literature, whereas in literary translation, poetic elements are used.

6.7 Challenges to Translating Social Sciences Text

Translation of Social Sciences literature demands special skills. This is the reason why some special problems and challenges arise in front of the translator while translating this type of material. If the translator is aware of these problems and challenges, then he can translate better. Therefore, in this part of the Unit, we are presenting these problems and challenges under different sub-headings :

6.7.1 Use of Appropriate Language for the Concerned Subject

While translating Social Sciences related material, a major problem is to use the appropriate language according to the subject and in the target language. In fact, the use of natural language is the test of a proficient translator. For this, along with the deep penetration of the translator, it is also necessary to have complete command over the language. Based on the knowledge of the subject, where he keeps in mind that the text presented in the original material should be completely presented in the translated material. He also keeping in mind that there should be no increase or decrease in the presentation of original message. The authority on the language such that the translator is able to present the text in the target language in a natural way. The test of spontaneity of language is that after reading the translated text, the reader should feel that it is reading original material only, its nature is not translational form. Translational form means - not being able to understand the translated material without reading the original material, its meaning not being clear. Such a translation is a bad translation.

In order to make the language comfortable in the translated text, the translator has to keep in mind the words used in the source language material, the technical terms, the grammatical

rules of the target language, linguistic idioms, native word usage etc. For example, translators focus primarily on words when translating knowledge-oriented or other subject-oriented material. In such a situation, there is a possibility of missing out for word for word translation. As a result, there is awkwardness in the target language. This fact can be explained with the help of an example. For example, if in the original sentence it goes that 'The leaders of many countries didn't know the psychology of Hitler.' then in this sentence special attention needs to be paid to the word 'psychology'. The translator would literal translate it. While in order to bring ease in the language the translator taking special care will use for the word 'psychology' in the above sentence for the word 'mood, state of mind, or attitude'. Similarly, if it is said that 'We must have to keep in mind the requirements, needs and psychology of the customer.' then here also it would be appropriate to use the word 'attitude' for 'psychology'.

While using natural language suited to the subject in the translated text, the translator can take the liberty to add or leave something in it to an extent according to the need and on the basis of his discretion. Or it may present a translation of a single sentence of the original text in more than one sentence in the target language. But while doing this, it should be kept in mind that message should not be harmed in any way.

The use of popular indigenous words also brings spontaneity and politeness in the language. The translator should not hesitate to use popular vernacular words as per the requirement. With this type of word usage, it is possible for the translator to give a smooth form to the language style of the target language.

6.7.2 Problem of Selecting Technical Terms in accordance with Area of Study

While translating Social Sciences material, the translator also has to deal with the problem of selection of technical terminologies. A specific term may be related to different original contexts. Because of this association with different original contexts, such terms can convey more than one shade of meaning. In this situation, the problem of choosing the right term arises. In such a situation, special understanding is expected from the translator to choose the appropriate term. For example, the English word 'charge' means 'accusation' in political science/law, 'mark of fame' in History and different meaning in Library Science. In the field of administration, this charge is used for 'expenditure' or 'functioning' and in commerce, apart from charge expenditure/expenditure, in the sense of 'intensive'.

While a translator of Social Sciences material is expected to have knowledge of the subject (i.e. choose technical terms according to the area of study), he is also expected to use appropriate terminology. But this does not mean that for each technical term, he should use equivalent technical term everywhere. This can lead to artificiality in the target language. The translator should also have the ability to decide where it is necessary to use a terminologically equivalent word and where it can be avoided.

Another side of the use of technical terminology is that the translator sometimes accepts two technical words in the same sense. In this connection the words 'development' and 'growth' can be seen which are used in the context of Economics. Knowledgeable of the subject of Economics knows that there is a conceptual difference in the meaning of these two words. 'Economic development' is the process through which any economy achieves economic growth over a long period of time and 'economic growth' refers to the continuous increase in the total production capacity of any economy over time. 'Economic growth' is usually measured by the rate of growth of 'Gross National Product' (GNP). The translator has to understand this kind of difference of meaning as well and should use the exact equivalent accordingly.

6.7.3 Problem of Selecting Appropriate Word

In some cases, more than one synonym is available for a single word in the target language. This situation is not only present in the general word, it can also be seen in the context of the definitional (technical) word. In such a situation, the problem arises in front of the translator as to which alternative to choose. As a solution to this, in case of Hindi translation it is said that the translator should use the synonyms given in the Glossary of Terms prepared by the Commission of Scientific and Technical Terminology (CSTT) of the Government of India. Today, the CSTT has determined the Hindi equivalents of the technical words of different subject areas of knowledge-science including Social Sciences subjects. This Commission is the apex body to modernize and standardize the formulation of technical terminologies at all India level. The Supreme Court of India has given a decision in a case regarding the necessity of using the terminology created by the Commission.

6.7.4 Problem of Coining New Words

A translator translating any type of literature in the sciences, including the Social Sciences, is expected to use appropriate and authentic technical terminologies. Considering the English-Hindi context, the appropriate terminology here means using the technical terminology related to the Humanities and Social Sciences set by the CSTT. But there is no doubt that updated versions of such terminologies are not published frequently. Whereas, during this time, many new technical terms come into use. Terminology has its own development process. New technical terms are constantly being created. They develop naturally in the source language, whereas in the target language, sometimes, they are developed through a planned process. And if in this planned process equivalent terminology is not created, then the translator is expected to create new words according to the need. Therefore, it is also necessary for the translator to have an understanding of the process of formation of technical terminology.

Although, the translator should avoid coining new words as far as possible because it is a difficult task. He should keep in mind that the new technical terms he creates should not be in conflict with the previous words in a way that means the translator should keep in mind that the new words are made according to the available vocabulary.

If we look in the context of Hindi language, then it can be said that in this, to create new words, root words, prefixes, suffixes, 'sandhi' (euphonic combination), compound etc. are the main elements. If the translator tries to create a new technical word for a particular definitional word in English etc. on the basis of Sanskrit root, then he must keep in mind that the wording should not be complicated, it should be simple as far as possible. In this pursuit of simplicity, he should avoid conjunctions and siphon between compound words. For example, using the conjunction method for the word multi-purpose.

In the process of formation of new words, many technical words are also adopted from other (source) languages. Then it is transliterated and used in its own language. Transliteration can take into account the nature of the source language (for example, English) as well as the nature of the target languages (for example, Hindi). The words can be adapted also on the basis of the nature of the target language. Sometimes a hybrid word can also be made by mixing both (source and target) languages. 'Petrol', 'Oxygen', 'Nitrogen', 'Computer', 'Mouse', 'Software', 'Radio', 'Telephone', 'Internet', 'Website', 'Mobile', 'i-pad', 'i-pod', 'Platform', 'Ticket', 'Railway Station' etc. are words adopted in Hindi from the English.

6.7.5 Translation of Social Science Text : Historical-Cultural Context

Necessary historical-cultural contexts are also included in the literature of Social Sciences subjects. The translator has to be especially careful with these references. For example, if the

phrase ‘spoils system’ occurs somewhere, the translator may try to translate it without knowing the context. Perhaps one would put a Hindi phrase which expressing ‘corrupt method’ or a similar sentiment, whereas for its correct expression it is necessary to be familiar with the political ideology of Andrew Jackson, elected President of America in 1824. Based on this understanding, he would get the meaning as a reward system or ‘prize system’ and translate in TL accordingly because President Jackson rewarded loyal party workers by appointing them to public offices in elections and named this system the ‘spoils system’. Therefore the translator has to be careful.

Another dimension of the historical cultural context is also associated with the mythic symbol. Myths and symbols are an integral part of any society-culture and its literature, but they carry specific meanings in themselves. In such a situation, it is not necessary that the mythological symbols of one language-speaking society express the same meaning in another language-speaking society. Although myths and symbols are used more in creative literature, but Social Sciences literature also does not remain untouched by it. Sometimes translators of Social Sciences literature also have to deal with them. For example, in most languages the word ‘donkey’ signifies ‘stupidity’. In India, the word ‘owl’ is also used in the same sense, while in the West it is considered a symbol of ‘prudence’ and ‘justice’.

6.7.6 Translation of Proper Nouns

In Social Sciences related literature, there is ample use of names of persons, place names or institutions etc. Instead of translating such names found in the translated material, they should be transliterated and presented in the target language. For example, the head of government of Germany is called ‘Chancellor’. In Hindi it should be written in transliterated form. However, while converting into the target language, care should be taken to adapt it to the source language in terms of pronunciation. As an exception, those words can be adopted for those person names or place names etc. which are prevalent only in their modified form.

6.7.7 Issues in Translating/Transliterating Abbreviations

The use of abbreviations is increasing day-by-day in various areas of our daily life. There is almost no field of knowledge or science including Social Sciences where they are not used. Not only they are used in written literature, they are widely used in oral discussions also. In today’s era of Information Technology, mobile phones have given a new dimension to the use of abbreviations. Because of this, new idioms with abbreviations are being coined in the language. There is no doubt that the use of abbreviations leads to tightness in the language. If seen from the point of view of rendering the subject, abbreviations help.

But from the translator’s point of view, abbreviations create problems. As a solution to this, he has the option of translating the abbreviation and presenting it in the abbreviated form or writes its full form in the target language. In addition, the translator can also present the full form of the abbreviation in the target language only in its transliterated form.

Being an alphabetic script, the nature of English written in Roman is conducive to abbreviations, while Hindi is written in Devanagari script with syllabic script. Syllabic script is difficult in comparison to alphabetic script in terms of making abbreviations. Abbreviations cannot be made in it as easily as they are made in syllabic script. Despite this fact, there is a trend of abbreviations in Hindi language as well.

The use of abbreviations is also seen in the Social Sciences, especially in the material related to Economics. These abbreviations emerge as a problem in front of the translator, if they are not solved properly, then there is a possibility of questioning the quality of translation. Authentic synonyms of abbreviations are not available in Hindi language, Hindi

Abbreviations dictionary is not published but it does not mean that translator should not try to solve this type of problem.

In this regard, first of all the translator should use the first option i.e. it should present the translation of abbreviations in the form of abbreviations only. Along with this, he can also do that where a particular abbreviation is used for the first time in the translated text, write its full Hindi (target language) form in brackets and thereafter use TL abbreviation everywhere else. While translating and abbreviating the abbreviation, he will also have to keep in mind that the created abbreviation should be easy to pronounce, otherwise that abbreviation will not be able to come into use.

Some abbreviations take the form of ‘Acronym’ i.e. they become a new word with the help of selected letters of a group of words. For example, the English word ‘SAFTA’ is actually an acronym for ‘South Asian Free Trade Area’. ‘UNESCO’, ‘UNICEF’, ‘BHEL’, ‘CAPART’, ‘AIDS’, ‘ISRO’, ‘HUDCO’, ‘OPEC’, ‘NABARD’, ‘REM’, ‘DOS’, ‘GATE’ Etc. are similar acronyms which are basically abbreviations of related word-groups.

ASEAN	Association of South East Asian Nations
AIDS	Acquired Immune Deficiency Syndrome
OPEC	Organization of Petroleum Exporting Countries
SAARC	South Asian Association for Regional Cooperation
ISRO	Indian Space Research Organization
HUDCO	Housing Urban Development Corporation
TRAI	Telecom Regulatory Authority of India
SIDBI	Small Industries Development Bank of India
BHEL	Bharat Heavy Electricals Limited
NACO	National Aids Control Organization

But we also have to keep in mind that such acronyms which come in other material sometimes create a state of mind when we transliterate them. For example, the acronym ‘Voice’ is the short form of the words ‘Voluntary Organization in the Interest of Consumer Education’ in English, whereas ‘Voice’ of English is ‘sound’ in Hindi. Some similar words are as follows

FANS	Future Air Navigation System
ARTS	Advanced Railway Ticketing System
SEWA	Self Employment Woman Association
Sita	Separation of Immoral Traffic in Woman and Girl Act
LIPS	Language Independent Programme Subtitling System
SALT	Strategic Arms Limitation Treaty
CLASS	Computer Literacy and Studies in Schools
PURNIMA	Plutonium Reactor for Neutron Investigation in Multiplying Assemblies

6.7.8 Problems of Translating Signs, Symbols, Equations etc.

For the clear and unambiguous rendering of the subject matter, special symbols and symbols are also used extensively in the language of Sciences. Similarly, such special symbols etc. are also used in Social Sciences material. You have read in Section 6.4.1 of this Unit that such symbols are specially used in the subjects of Economics and Statistics in the Social Sciences. In the presentation of the subject matter, these devices play a complementary role to the literal interpretation. These symbol-diagrams are very important in rendering any complex base in a relatively simple form. The important thing for the translator to keep in mind is that these marks have got international form. Therefore they should be used in the same form in translation, using them according to the original.

6.7.9 Use of Idioms and Proverbs

The use of idioms-proverbs etc. is common in creative literature. By using these, language beauty increases, they enrich the language with the denotative word-power and sarcasm. From this point of view, they are not used in the literature of all kinds of knowledge-literature including Social Sciences, because in the literature of knowledge, message is presented in very clear language through denotative word-power, but it does not mean that literature related to the knowledge-domains remain untouched by the use of idioms, proverbs etc.

It is a challenge for the translator to present the idioms and proverbs of the source language in the target language. For example, in the sentence ‘reconstruction of post-war economy in herculean task.’ Here, ‘Herculean task’ is an English idiom denoting ‘hard work’. Its equivalent in Hindi is ‘*Bhagirath Prayas*’, which has been determined on the basis of knowledge of the perspective of the Indian tradition.

Similarly, the sentence ‘It is an appropriate time for breaking the ice between India and Argentina.’ Can be seen in which idiomatic usage is found as ‘breaking the ice’ which mean ‘remove the deadlock’. While translating this sentence into Hindi, translating should have to adopt the sense contained in original.

6.8 Let Us Sum Up

In this Unit, the meaning of Social Sciences literature and its various dimensions as well as the characteristics of its language have been explained. Now it must have become clear to you what is meant by Social Sciences and what are the major subject-areas covered under it. The Unit also covers the differences from Natural Sciences to Social Sciences. Social Sciences are such a subject which is closely related to our lives. Its vocabulary is also such that we are relatively more familiar with it than the vocabulary of subjects like Sciences. Despite this, the language of these disciplines/subjects has its own specialty. Therefore, here this linguistic feature is underlined and its difference from the language of Natural Sciences subjects is also considered.

Along with this, it has been explained that what the prerequisites for translation of Social Sciences literature are. In this context, it is necessary to pay attention to another aspect of their translation i.e. the difference between the translation of Social Sciences related literature and Creative Literature. Hence, it has also been included in this Unit. At the end of the Unit, various problems related to translation i.e. challenges emerging before the translator of Social Sciences literature are discussed in detail and with ample examples. The next two units deal with another area of knowledge i.e. literature of Science-Technology literature.

6.9 Exercises

1. Explaining the meaning of Social Sciences, throw light on its generality/breadth.
2. Explaining the difference between the language of Natural and Social Sciences disciplines, describe the characteristics of the language of Social Sciences disciplines.
3. What is the difference between translation of Social Sciences related literature and Creative Literature?
4. What are the prerequisites for translation of Social Sciences literature?
5. Throw light on the challenges of translation of Social Sciences literature.

6.10 Suggested Readings

- Bhatia, Kailash Chandra, 1985. *Anuvad Kala : Siddhant Aur Prayog* (Translation : Theory and Practice), New Delhi, Takshashila Publications.
- Tiwari, Bhola Nath (ed.), 1986. *Vaigyanik Sahitya Ke Anuvad Ki Samasyaen* (Problems of Translation of Scientific Literature), New Delhi, Shabdakar.
- Sethi, Harish Kumar, 1997. *Padnaam Aur Sankshiptaakshar : Hindi Anuvad Ka Sandarbh* (Designations and Abbreviations : Reference to Hindi Translation), Delhi, Sahitya Bharati.
- Rastogi, Alok Kumar, 1990, *Hindi Mein Vyavaharik Anuvad* (Practical Translation in Hindi), Delhi, Sumeet Publication.
- Comprehensive Glossary of Technical Terminology : Humanities, Volumes 1 and 2, 1992. New Delhi, Commission for Scientific and Technical Terminology.



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Unit 7 Literatures of Science-Technology : Meaning and Dimensions

Structure

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- 7.2 Literatures of Science-Technology : Concepts and Dimensions
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- 7.6 Essentiality and Status of Technical Terminology in Science-Technology Text
- 7.7 Formation of Technical Terms of Science & Technology : Historical Perspective
- 7.8 Let Us Sum Up
- 7.9 Exercises
- 7.10 Suggested Readings

7.0 Objectives

After reading the present unit, you should be able to:

- understand the meaning of literatures of science and technology and the nature of its writing;
- know about the types of literatures of science and technology;
- familiar with the features of its language; and
- know the status of technical terminologies and their historical perspective in the science-technology literature.

7.1 Introduction

In this Block-2, you have studied Translation of Humanities and Social Sciences literature. The next two units of the block deal with Translation of Science and Technology literature.

While considering translation of science and technology literature, we would also like to remind you that the style and language of translation, the subject matter and the target

audience, may differ according to the ability, qualification and need of the audience. These differences in translation at the subject level are of two types - differences with other disciplines (such as differences between Social Sciences and Science), and differences between sub-disciplines within themselves (such as differences between computer science, chemistry and anthropology, etc.). By studying Units 7 and 8, you will be able to familiarize yourself with the concepts of effective translation of science and technology literature with due fidelity to the original. But before that it is also necessary to understand what is meant by science and technology.

Unit-7 explains the concept of science and technology literature and throws light on its various dimensions. Along with clarifying the meaning of science and technology, it has also been told what is their relation with language and what is the meaning of literature related to them. Science-technology literature is broadly considered to be of three types – technical science writing, popular science writing, and creative science writing. In this unit you are also being introduced to these three types of science-technology literature. Along with this, information is also being given about the nature of science and technology writing. These types of writing include original science writing, science adaptation, and translation of science writing.

The unit also throws light on the linguistic features of science-technology literature. This introduction will develop an understanding that similar characteristics should be reflected in the language of translation of science and technology literature. Since technical terminology has its own place and importance in science and technology related literature, its status has been explained in the last part of the unit along with the historical context of its construction has also been presented.

7.2 Literatures of Science-Technology : Concepts and Dimensions

Today is the era of science and technology. No country-society is untouched by its influence. The situation is that it has become the measurement of progress of any country. All developed, developing and underdeveloped countries want to be associated with it. In this field, efforts are made to move forward through knowledge and research. Since science and technology literature is of great importance in the attainment of scientific knowledge, translation is of great importance in it. For this reason, it becomes necessary for us to understand the perspective of science and technology, to be familiar with its concept and the dimensions associated with it.

In the broadest sense, the term ‘science’ is understood to include both science and technology, therefore, in this unit, where ‘science’ word is discussed, it will also mean that the same fact or idea is ‘technology’ are also applicable. However, we are discussing them separately in this part of the unit to clarify the concepts involved. Let us first see what is meant by science.

7.2.1 Science : Meaning and Dimensions

‘Science’ means to discover the cause-effect relationships of phenomena, basic concepts, rules and principles through the scientific method. The code of knowledge obtained from this discovery is called ‘Science’. It is not related to ‘complete knowledge’ but ‘special knowledge’. The word ‘science’ means - systematic, rational, well-connected information on any subject that prevents confusion. The knowledge obtained by science should be real, reliable and testable, so there is a definite method to obtain that knowledge. This is called the ‘scientific method’. The scientific method mainly includes the following things:

1. Observation of events, collection of data and research.
2. Presentation of a rational hypothesis to understand the cause-effect relationship of events (e.g., Einstein made a revolutionary presentation regarding light-rays, whereas before him light-rays were considered as waves of matterless energy. Einstein's hypothesis was that light rays were actually streams of particles, and since those particles contained matter, they would be affected by gravity.)
3. Hypothesis-based prediction means 'announcement of future event on the basis of presented hypothesis' (as Einstein said that when the light-ray passes near the Sun, the particles of the light-ray will be attracted by the Sun. Therefore, the path of that ray will be curved away from the straight line. He predicted not only the curvature of the ray path caused by the Sun but also the degree of its curvature.)
4. Experiments to test hypotheses (e.g., after World War-II, teams of British scientists conducted experiments at two locations at the time of a total solar eclipse and found Einstein's prediction to be true); and
5. When the conclusion of a hypothesis is proved to be true, that hypothesis is considered a theory.

In the scientific method of making a scientific theory, the first four tasks given from Sl. No. 1 to 4 is essential.

The vision of science is completely materialistic. This is his strength as well as weakness. No evidence other than 'firsthand/direct/perceptible evidence' is acceptable to him, while creative literature is the expression of the feelings of the heart, which depends on the sensitivity and creative ability of the writer. This sensitivity and creative ability is not the same in all writers. Seeing the same sunrise, many poets may have completely different expressions in their mind, which need not match with the facts. Therefore, the 'classical literature' and the 'classical literature of science' are also different from the creative literature, which is also a desirable phenomenon.

With its purely materialistic outlook Science also turns away from spiritual knowledge which is seriously undesirable as such an outlook alienates it from the basic identity of humanity. It is admirable that in science there is importance of integrity, logical thinking, collaboration, openness and analysis, but the proof of their basis is the search for physical truth only and the objective is utilitarianism. The scientific basis of values like love, service, sacrifice, sense restraint etc. is not with 'Science', nor with 'Western Philosophy', while 'Indian Spirituality' is with it.

It is to be noted that the work of science is the discovery of rules or principles and on which discussions etc. take place. Therefore, they are included in scientific literature or writing. Science can be divided into two parts - (1) subjects related to natural science; and (2) social science subjects. 'Natural Science' includes the basic subjects of science like Physics, Chemistry, and Biology. In addition, there are subjects of 'Applied Science' such as Engineering, Statistics, Bio-technology, Agriculture etc. (this will be discussed in Section 7.2.2 of this unit). Whereas, 'Social Science' includes subjects like Sociology, History, Public Administration, Civics, Political Science, Economics etc. This unit is focused on 'Natural Science'. Therefore, we are thinking in terms of science and technology.

In Natural Science, the forces of nature and the cause-effect relationships of events or the laws related to them are explained. This knowledge is objective. In Natural Science, the

scientist is the only observer using experiments. While studying the natural phenomenon, the scientist neither sees it from an emotional point of view nor does it express itself emotionally. He wants to discover and express the cause-effect relationship of natural phenomenon and its laws objectively. For example, although Einstein himself was fascinated by the mysteries of the universe, but his scientific description or explanation was completely objective.

Even in Social Science, there is objective vision as much as possible, but it is human-relative. Because of being relative to human, Social Science has an emotional perspective. For example, the basis of 'Communism' is so sympathetic to the poors that they even want to hand over the reins of power to them. If someone has special sympathy for the poor but does not consider him worthy of power, then he can reject his communism. In the sciences like Psychology and Anthropology etc., there is more possibility of emotional vision and its emotional expression on the event. Therefore, Anthropology has been divided into two parts - scientific and cultural anthropology. In the Social Sciences or Humanities, the 'human' may be an active part of the target subject i.e. his feelings may influence his observations, subjects, conclusions etc. For example, on Casteism, people of different castes may draw different conclusions from the same events. Therefore, the possibility of that conclusion not being objective increases. Social science, unlike Natural Science, is not completely objective. Although we consider History as an accurate science in a way, but the histories that are written about the same event are also different. It has even been seen that they are even contradictory to each other. The main reason for this is that there is difference in the vision of historians. On the other hand, as far as science subjects are concerned, this type of difference of vision is not found in scientific findings. They are virtually universal.

All the truths related to life cannot be known by logic alone. A major difference between science and other disciplines is the examination of truth, of conclusions by the scientific method. Yes, truth is also tested in spiritual knowledge, but this test becomes possible by entering within oneself. There are standardized methods for performing this assay. Any idea remains a hypothesis only by arguments, it does not become a universal principle. A great quality of science itself is that even after its theories are accepted, they can be proved untrue by the scientific method. This is exactly the way Einstein disproved Newton's theory of gravity.

Here a question may arise whether the subject 'Mathematics' can also be considered as a branch of science like Physics, Chemistry, Biology etc. In this context the interesting fact is that mathematics is not a science even though it is completely rational, because its theorems are not necessarily related to reality. The theorems of mathematics cannot be tested by the scientific method. Mathematics can also be called a language, but the soul of that language is logic. Despite this difference, seeing the similarity between mathematics and science, it is kept along with science and technology.

Aristotle or Newton etc. are often discussed while considering the history of science. This is a situation of taking the basis of western vision. In this regard, we should not ignore the names of Indian scientists. In fact, Charak (eighth century BC), the pioneer of scientific thinking and Ayurveda; Sushruta (seventh century BC), the pioneer of surgery; Maharishi Bhardwaj (sixth century BC), the pioneer of aviation science; the founder of atom theory Kanaada (600 BC), the alchemist Nagarjuna (100 AD), the correct interpreter of the revolution of the Sun by the Earth, its velocity and eclipses; and Aryabhata (500 AD), the pioneer of the place system and the decimal system of numbers; Lallacharya of 6th and 7th century, astronomer Vateshvara and Varahamihira (990 AD), mathematician of 12th century and the originator of the concept of gravity Bhaskaracharya-II, who did research on the orbit, velocity of planets etc.; have no

less importance in the field of science. The work done by Madhvacharya in trigonometry in the 14th century was done by Leibniz 300 years after him. In this context, the names of 15th century Neelkanth and Somayji, 18th century mathematician Bapudev Shastri etc., who did fundamental work on trigonometry, are also particularly noteworthy.

7.2.2 Technology : Meaning and Dimensions

The word 'Technology' comes from two Greek words - transliterated 'techne'; and 'logos'. 'Techne' means art, skill, craft, or the way, manner, or means by which a thing is gained. And, 'Logos' means word, the utterance by which inward thought is expressed, a saying, or an expression. By associating with the industry, it becomes related to the larger industry (technology). 'Industrial' increases productivity while reducing labour and difficulties by applying the principles of science. Technology also invents and manufactures any useful item, equipment or machine etc. on a large scale by using the principles of science i.e. 'applied science'. 'Technology' is called 'Practical application of Science'. This is the reason that now-a-days technology is also considered to be included in the term 'science'.

Today we cannot imagine our life without technology products because it has given us wonderful facilities in life. In other words, it can be said that technology has greatly increased the level of our civilization. If technology manufactures on a large scale, then it also has to sell that product on a large scale. This is the reason why industrialists control the market as well. Therefore, capitalist countries control the world by exerting influence on the market and ultimately on culture.

We should not underestimate the power of technology. It has taken over our lives, even controlling our lives and our thinking, which can be harmful. Where technology provides us with wonderful-unique facilities also, it can also make us indulgent. It is also necessary for a translator to understand this, only then he will be able to translate the words 'Global Village', 'Consumerism', 'Free Market' even 'Freedom' etc. correctly.

7.2.3 Relationship between Science-Technology Contents and Language

In this section of the unit, we will study about the relationship of science and technology with language. Let us first know the relation between science and language.

Relationship between Science and Language :

There is a relation between science and language. Not only does science give new words and concepts to the language, but it also gives a form to the language, a method with the power of thought to the readers. It also gives human values to the reader like honesty, cooperation to some extent, although these human values are incomplete and do not reach complete morality. Science and its application Technology not only affects the physical life of a person, but also affects his thinking and his way of thinking. This topic will be discussed further in this unit.

Relationship between Technology and Language:

Like science, technology also has a deep connection with language. Technology also gives new words and concepts to the language. It also gives shape to the language. Technology also gives readers a method with the power to think. Technology gives human values like convenience, conscientiousness, competition, enjoyment, happiness to some extent to the consumer, but proves their desirability not through arguments, but through colorful and attractive mediums so that the message or value goes beyond logical thinking. This can be dangerous. Technology (besides science) affects one's life. The human values that science gives are desirable for humanity, but the human values provided by technology should be accepted after a lot of thought.

7.2.4 Meaning of Literatures of Science-Technology

The purpose of scientific literature is to exchange knowledge among scientists, to increase the knowledge of students and curious people, to prepare historical documents and to increase scientific understanding in the general public. Scientific literature inculcates curiosity, ability and power to question and answer, loyalty to evidence, rational thought, freedom from irrational fears and superstitions, inspiration for research and development, and love for knowledge.

Welfare of the society is the main objective of literature. The accumulation and preservation of literature is done because it is in the interest of the society. The writing which is entertaining i.e. which does not have a sense of social interest (although entertainment can also be in the interest of the society) or which has the possibility of social harm, then that writing cannot be called literature, nor should it be welcomed.

Since the main purpose of literature is the interest of the society, its accumulation and preservation is done because it is in the interest of the society. The same logic applies to scientific literature as well. It would be appropriate to say here that the research works of fundamental science i.e. science are basically the exploration of truth, at that time they are beyond social interest. Sometimes the determination of social interest itself becomes difficult. But basically it has to be kept in mind that although the place of truth is above the social interest, still efforts have to be made to coordinate truth and social interest as much as possible.

7.3 Types of Literatures of Science-Technology

You have read in the previous Section 7.2 of this unit that knowledge of science is needed by many strata of society and by different needs of the aspirants. In this, there can be teachers, students, inquisitors, science-writers etc., who do research in the subject of science, or people from different professional classes (like engineers, doctors, etc.) Because of all these, the science-technology literature created also becomes of different types. The categories into which these different types can be broadly divided are – (1) Technical Science Writing, (2) Popular Science Writing; and (3) Fine/Creative Science Writing. Let us consider these one by one.

7.3.1 Technical Science Writing

‘Technical Style of Science Writing’ means that science writing which has technicality in its language form. A language is seen to be technical when maximum information is given in minimum number of words. In this effort, while explaining the concepts etc. (i.e. instead of trying to explain the meaning by explanation) more and more technical words are used so that the language becomes tight. Unnecessary words, phrases and contexts etc. are not given place in writing to bring this type of tightness in the language. Apart from this, in order to clarify complex concepts, necessary special symbols and diagrams etc. are also used in it so that brevity and subtlety can be included in the language form. In this way it can be said that conveying maximum information in minimum words brings technicality in the form of language. Therefore, technical scientific writing tends to be somewhat confusing and can be understood well only by a person with a scientific background. This type of technical science writing is available to us in research papers, high-level articles, technical books-magazines, definitional dictionaries etc.

7.3.2 Popular Science Writing

The main objectives of ‘popular science writing’ are to create scientific temper in the masses and to increase the attraction towards science. Science writing is not needed only by those

who study the subject or subject-experts, the general public also needs the knowledge of science. This information can be accomplished by 'popular science writing'. Science writing is simple and easy in its language; there are fewer technicalities in it. This type of writing uses relevant science information (e.g., scientific concepts, laws), interesting and inspiring incidents from the lives of scientists, interesting scientific events, etc. to create scientific understanding. In this writing, the length of the article is kept so that it be understood without any difficulty. Normally, this writing is first published mainly in magazines etc. which can later be given the form of a book.

'Popular science writing' is the simplest form of science communication. But this does not mean that writing such articles is easy. The reality is that reading and communication of this type of article is easy, but its writing is difficult. Composition in simple language and interesting style increases their usefulness and popularity. For example, some authors have given interesting examples to explain Einstein's concept of 'Relativity of Time', which is as follows - '30 minutes spent with a girl-friend may seem equal to 10 minutes and with an unpleasant person 10 minutes spent may seem like 30 minutes.' Although this example is very popular, it is completely wrong to explain this concept of Einstein. Einstein's 'Relativity of Time' is not a mental illusion but a physical reality. The meaning of this concept is that time really expands with increasing velocity or his clock really slows down. In that case the watch is not at fault. If two identical clocks are placed one on Earth and the another on an artificial satellite, it happens that the clock on the artificial satellite will run slower. The scientific reason for this is that this dilation of time does not happen only in the watch, but it happens only in the time there. If seen on the basis of this concept of 'Relativity of Time', the age of Indian astronaut Rakesh Sharma, who went into space, would have increased a bit (a few thousandths of a second) as compared to the earthlings after orbiting in the satellite.

Another interesting illustration is given under the theory of 'Relativity of Time', which is called the 'twin paradox'. There are two twin brothers whose age is say 25 years. One of them flies in a high-velocity rocket (about 95% of the speed of light) to the nearest star 'Alpha Centauri' and returns in ten years according to his clock. When he meets his brother, he is surprised to see that his twin brother is almost 60 years old. And his brother is equally surprised.

To write popular science, along with the art of writing, there should also be a correct and good understanding of science. The deeper the writer's understanding of science, the more simple and correct expression he will be able to make.

There is no fixed measurement of popular science writing. It depends on the mind of the writer and his understanding of the needs of the readers. If such articles are written on any famous recent event, such as on the release of a satellite in space, or on the God particle at the time of the news of the giant hadron component, or on swine flu at the time of swine flu, then there is a demand for them and readability, both will increase.

While writing popular science, attention should also be paid to the title of the subjects presented. Their titles should be very interesting. A good title is very important in today's time to catch the reader. Consider the following examples illustrating the nature of popular science writing:

Science writing also has its own culture. Einstein and Niels Bohr were once talking about the observation of 'quantum mechanics' in which repeated repetitions of the same event yielded different results. Bohr's statement that this is true i.e. the results of the same event can be random. Einstein believed that we

are not able to understand the definite cause-and-effect relationship of the phenomenon because ‘God does not throw dice’. It was a fundamental belief of Einstein that according to the invariable principle of causality, the results of the same event do not change on repeating it in the same form, are not random. In that event of quantum mechanics, the results were random i.e. the rule seemed to be breaking. When Einstein says this, it means that even God does not break the rules of science, and then quantum mechanics was accepting the observation of such breaking rules as true. In Einstein’s view, this breaking of the rules is the breaking of the foundation of science itself. After this, what Niels Bohr gave is also worth noting - ‘Don’t order God’. This means that we observe, make concepts and make theories. Whatever concepts or principles emerge from this scientific method, they should be acceptable to us, even if they break the laws of ‘God’.

7.3.3 Creative Science Writing

Creative science writing is also a method of science communication. Creative science writing means to create scientific understanding (scientific temper) in the public and to increase the love of science through creative writing. Article, story, poem, drama, novel, puzzle etc. are the different genres of creative literature.

Does popular science writing have to be cute? No, it is not necessary. If it became graceful, then it would be more popular and in that case it would be called ‘creative/fine science writing’. So the task of creative/fine science writing is ‘science communication’, similar to ‘popular science writing’, but the difference is that it is enjoyable.

To make science writing enjoyable, its style has to be graceful, it has to touch the heart of the reader so that the reader imbibes the knowledge communicated by him with pleasure. Suppose you want to write a scientific article on Khanjan bird in Hindi and you choose its literary title, ‘*Jani Sharad Ritu Khanjan Aaye*’, just the beginning of the romantic style. And the Hindi article can be started in this way - ‘*Pai Samay Janu Sukrit Suhaye*’. In the meantime, the reader will remember the unique episode of Indian classics *Ramayana* and at the same time he will also understand that Khanjan is a migratory bird whose arrival depends on our prudent actions towards the environment.

This type of style is rare for science writing because it demands knowledge of both the subject and the language as well as graceful creativity. It uses idioms, rhymes, metaphors, similes and stories. Many scholars from India and abroad have created scientific understanding towards ‘science’ in the general public by writing creative/fine science works through articles, stories, poems, plays, novels, puzzles etc. and have increased love for science.

7.4 Nature of Science-Technology Writing

From the study done till now, it must have become clear to you that the body of knowledge related to the field of science and its application (i.e. fundamental subjects of science and applied science) is science-technology literature. We are broadly addressing this literature as ‘science literature’. This science literature reaches people through language in its written form. Therefore, it seems necessary to have a little thought on the nature of this science writing here.

When we consider the nature of science writing, we find that it reaches us through various mediums. Some of these major mediums are books, research papers and research journals,

dictionaries and encyclopedias, and articles presented by mass media etc. The science and technology literature that we get through these different mediums can be seen by dividing them into the following categories - (1) Original science writing, (2) Adaptation of science writing; and (3) Translation of science writings. Let us consider each of these three categories related to the nature of science writing respectively.

7.4.1 Original Science Writing

Research and its application in science and the work of discussion or review on it is important. The writing in which scientists and researchers describe their or other's discovery or research or make original critical description or comment on it is called 'original science writing'. They write assuming that their readers will also be scientists or researchers or well-versed in their subject. The level at which, the language and style in which they write can only be understood by the experts of that subject. His article describes the process of pure discovery or research or discussion etc. His writing style makes the subject technical.

Original science writing helps in furthering scientific thinking, knowledge, science and research work in this field. This develops fundamental knowledge in a particular branch of science and also develops the tradition of related writings. For example, in ancient India, a long tradition of original writings on these subjects developed as a result of the original works in the subjects of Philosophy-Spirituality, *Mimamsa*, Poetics etc.

Original writing also develops language. It is also worth noting that the development of language is easy and natural, because with the development of science and research work, where there are new ideas, new concepts and new discoveries, there are new words and expressions related to them also continue to be created. Sometimes old words also get new meanings.

Original science writing also has its own linguistic characteristics. In his language, adequate technical terminology, equations, formulas, graphs-diagrams, special symbols etc. are used. The language style of original science writing is also realistic. In fundamental science writing it may be necessary for a scientist to coin new words or new definitions for his new concept, new research or new discovery, such as 'Black Hole' or 'Big Bang' or 'God Particle' etc. Now-a-days, in field of science, hundreds of new words are being coined everyday. The whole effort of the scientist is that the meaning of the writing should be certain, there should be no uncertainty in it. Its communication should be such that it can be understood by experts in that subject, and it is very important that it contains enough information or given enough references to fully test the knowledge presented. Before the publication of important original articles, they are also reviewed or revised by many scholars.

'Philosophy Naturalis Principia Mathematica' (i.e. 'Mathematical Principles of the Philosophy of Nature' : Newton's Laws of Motion, Kepler's Laws of Planetary Motions together with Newton's Theory of Gravitation) is an outstanding example of original science writing. In it, Newton not only fully describes his theory of gravity and the differential and integral calculus used in it and invented by him, but also describes his philosophy of science, how the scientific method works. To do this in those times was a very forward-thinking act because at that time the thinking of science itself was developing. We know how important scientific methods are to scientific research. Newton had to write three thick texts for that. He laid the foundation of scientific thinking, scientific methods and original science writing. These books of his are unique examples of not only original science writing but all kinds of science writing. But you will be surprised to know that even then his theory was not immediately accepted by all the scientists.

It is a matter of observation that although the communication of original science writings is limited to some experts, but this original writing is the source of all science writings. This writing is mainly done in research journals, specialized science journals, specialized texts, letters of scientists and their talks etc. and now-a-days electronic medium and CD/DVD. It is found in such tips. The whole society needs the knowledge of science, but not everyone can understand this fundamental writing, so translators and ‘science communicators’ are needed.

Fundamental science writing is not less than any creative literature, but can be even better - Newton’s ‘Principia Mathematica’ is not less than any literary work in the world in its originality, its impact on the world and its creativity. This superiority is also in both special and general theory of relativity of Einstein. The only difference is that they describe the laws of the physical world and research work, while literature is a creation related to human behaviour.

Today there are two cultures in the world - one scientific; and other literature and arts-centric. But unfortunately there is a huge gulf between the two. One, the spread of science is very limited and secondly, it is considered difficult. ‘Science communicators’ and ‘translators’ can go a long way in popularizing science literature and help bridge this gap.

7.4.2 Adaptation of Science Writing

It has already been mentioned in Section 7.3 of this unit that knowledge of science is needed by many strata of the society and by different needs of the aspirants. Those who search or research in the same subject, teachers, students, inquisitors, science-writers etc. and professional classes like engineers, doctors, etc. need it. Relatively simple science-writing that meets such a need is called a ‘Science Adaptation/Adaptation of Science Writing’. ‘Science Adaptation’ is also called ‘Science Communication’.

Science adaptation is the process of simplifying original science writing. Under this, science writing is presented by adapting or editing in the language of the original text and also by modifying and editing in other languages. When it is given a modified-edited form in a language different from the original, then in that case there is a need to translate the original. It is certain that at the root of this type of adaptation lies the idea of presenting the important aspects of science-technology literature in a concise form, so as to take into account the paucity of time, abundance of literature and the personal needs of the readers. Keeping only that much material should be made available which is in accordance with the expectation and need of the target readership. In this way, while trimming the material and providing it with a relevant environment, there is also an emphasis on comprehensible presentation of the text. While presenting the text in a comprehensible manner, it is also included in explaining the meaning of the terminology used in the original. In fact, at the root of this type of adaptation of science writing lies the idea of promotion of science. Therefore, this type of ‘science adaptation’ is also called ‘science communication’. Through science communication, non-scientific society is informed about various aspects and topics of science so that they can understand science, they are attracted towards science.

The ease of science adaptation or the multiple levels of communication are decided keeping in mind the ability of the target audience to understand. For example, there is a wide difference in the comprehension of graduate level readers and readers of primary or middle school level. Therefore, there should be a difference in the level of writing for them. This writing is found in the form of scientific and other informative books, magazines, newspapers, letters of scientists and their talks etc. and now-a-days with electronic devices.

Although there is relative freedom in adaptation, it is kept in mind that it does not affect the factuality and integrity. If the compilation of facts or their interpretation has been done for the purpose of establishing an opinion, then that writing will not be called truthful even if it is factual. Some scientists out of greed try to cheat like this, but sooner or later they are caught because the knowledge of science is tested again and again e.g. Einstein is still being tested today.

7.4.3 Translation of Science Writing

Knowledge is the unique identity and power of mankind. Therefore, getting knowledge should be the main objective of human. The development of science and technology cannot happen without proper knowledge. Today science and technology are essential for material progress, development and economic and military power. How developed a country is, it can be measured very accurately from all (original and translated) science writing happening in that country. There is no doubt that today no country - developed or developing - can do its holistic development only through its own scientific-technological knowledge. It is necessary for our countrymen to imbibe the knowledge made or available in the field of science and technology in any other country. Translation proves to be a useful medium in this work. It is clear that a developing country like India needs more translation than the developed countries. Knowledge from other languages can only come through translation. Thus translation plays an important role in technology transfer. Translation in the field of science makes it possible to be a true '*Vasudhaiva Kutumbakam*' (i.e. the whole world is a family), as well as contributes significantly to the work of science dissemination in our country. Translating from different languages enriches the target language and knowledge.

Translation of original science writing is not only necessary, it is essential because it is a global cooperative work. In the development of science, all developed countries work in their own languages. A high level of knowledge of many languages like English, French, German, Russian, Italian, Dutch, Danish, Japanese etc. is not practical for a high level scientist as he cannot know all these languages. There cannot be desired progress of science without translation, otherwise most of the researchers will keep inventing on the same subject again and again. To clarify this topic, we can take the help of an example. For example, the father of genetics, Gregor Mendel's first important paper on the subject, 'Laws of Heredity of the pea', was published in German in 1865 in a journal of the city of Brunn in Moravia. The paper was also presented to scientists there twice. But it was not disseminated and translated. Even Charles Darwin was not aware of it. There was a delay of more than thirty years in the progress of science related to this subject. On the contrary, the state of science today has been possible on the basis of the immediate translation of Einstein's revolutionary but esoteric writings published in German language because of the large contribution of non-German-speaking scientists in the work of their later researchers and development.

We can say that as far as original writing in this subject is concerned, it can be self-motivated, and also for professional or financial gain. Most of the work (profession) and economic benefits give inspiration for translation writing, but there is also self-motivation. This self-motivation can also be for the purpose of spreading science and sometimes it can be a motivation to accept a challenge. Dr. Meghnath Saha had spontaneously translated the form of Einstein's theory of General Relativity from German to English, which could have been more useful for Indian scientists and happened.

Original science writing and science adaptation i.e. the requirements for translations of both types of science writing are also different. But there is one requirement for translations of all types of science writing - knowledge of the other language's vocabularies cannot translate

correctly. All the meanings of specific words and their depth cannot be given in dictionaries. To know them, it is necessary to know, understand or experience the life of the vibrant culture of that language.

Thus it is clear that presentation of science and technology related literature in another language is possible through translation. This submission can also be of translations of original science writing (whether technical in itself or popular science writing), creative/fine science writing, and science adaptations. Let us now consider translation in the context of these.

(A) Translation of Original Science Writings:

Although factuality is essential in all types of science writings, but 100 percent factuality is essential in translation of original science writings. Therefore, it is very important for the translator to have sufficient knowledge of the subject for translation of original literature on science, and he should not hesitate to take help from a scientist if needed. Although it may take a long time to acquire sufficient knowledge, it should be a continuous effort to acquire it. Such integrity should be there in both ‘science communicator’ and ‘translator’. Like the original, there should be no uncertainty in the meaning of the translation. Formulas and diagrams should be taken almost as they are. The constitution of the language should be such that the translation does not become unnecessarily long. The difficulty of translating original science writing is mainly the difficulty of understanding and explaining its subject matter, its sometimes complex style and the complete freedom of use of mathematical and scientific symbols etc. It has to be kept in mind that the translation should be understandable to the subject matter expert. In this type of translation, the translator cannot take liberty i.e. neither can he leave some part of the original nor can he add anything from his side. The help of machine translation (MT) software can be taken for translation of this type of material i.e. translation can also be done through translation software.

Translation of original science writing is intellectual, it can also be emotional. To make translation emotional, creativity is expected. Understanding the meaning of words alone does not work, it is also necessary to understand the cultural, social and thematic meanings of idioms and specific words and text. To simplify it, the communication of the original science writing increases by explaining the concepts of technical words and principles, giving examples, with the help of pictures etc.

(B) Translation of Adapted Science Writing:

Science adaptation writing may differ widely from the original and the translation because of differences in the ability of the readers of the original language to understand the science topic and the readers of the target language. The translator should understand the receptivity of his target readers and it is desirable to do communicative translation keeping that in mind. Conciseness is accepted as a desirable quality of ‘science communication’, but not at the cost of communicativeness for adaptation writing. It is also desirable to keep the language and concepts as simple as possible. Concepts should be clarified where necessary, they should be explained to readers of the target language. In order to increase the communicability in translation, it must be explained through comments, but it should also be kept in mind that the factuality of the subject should not be distorted. In this type of translation, the translator takes liberties/freedom. One of the hallmarks of a good translation is that while reading it one feels that it is not a translation.

Like original science writing, translation of science adaptation writing is also intellectual. But it can also be made emotional - all it takes is creativity. Along with understanding the meaning of the words, the translator also needs to understand the idioms and specific words,

the socio-cultural and thematic meanings of the text. Communicability of the article etc. can be increased by explaining concepts and principles of technical words, giving examples and taking help of pictures etc. to simplify the translated adaptation writing.

(C) Translation of Creative Science Writings :

Translation of 'Creative Science Writings' is more difficult than translation of 'Popular Science Writings' because of the elegance involved. Although this is also basically creative literature. However, the basis of difference between these two becomes the subject matter. Science is present in the subject matter of 'creative literature'. But, translation of beauty is difficult in itself. Just as aesthetic expression in creative literature in various genres (i.e. language, simile, verse, myth-symbol, idiom, style etc.) poses challenges to the translator. The translator of creative/fine science writing also faces similar challenges. He has to translate similes, metaphors, idioms etc. Mechanized translation of such literature cannot be done. See an example of a computerized translation of an idiom – 'Flesh is weak but spirit is strong.' It was to be translated from English to Russian with the help of a computer. But to test the accuracy of that translation, the Russian translation was again translated into English. Then came this translation in English - 'Meat is rotten, but vodka is strong.' A Hindi translation software translated 'Radha sings well' as '*Radha kuan gaati hi.*' which means 'Radha sings in the well'.

In the translation of creative/fine science, the translator can also take more liberties to bring elegance. Literal translation of similes, metaphors, idioms etc. is fraught with danger. It is better for the translator to find equivalent similes, metaphors, idioms etc., otherwise it is better to explain the meaning.

Science-Technology Writing and Machine Translation :

From a new perspective, translation can now also be divided into two types: (1) Human-made translation; and (2) machine translation. Now the importance of the need for translation has increased a lot. And the operating power of computer or phone has increased so much that suitable machines translate instantly into major languages of the world (there is no Indian language among them), although these translations are still improvised. Now this translating machine is becoming a hand phone instead of a big computer. First such phone is being made for English and Arabic languages. It does not translate word-for-word, but presents the translation by matching the words kept in its memory, that too not only in text but also in speech. This is also becoming possible after better understanding of speech in digital mode and after increasing the operating power of the phone, and this power is going to increase.

Whether it is original science writing or adaptation writing – machine can be used in this because this type of literature is basically written in denotative simple language. But wherever emotion and creativity are required in translation, the machine is still far away. An interesting example of this type of machine translation has already been mentioned.

7.5 Features of Language of Science-Technology Literatures

We have been discussing the specialty of the language of science and technology in different contexts. Here we will now discuss that feature in more detail.

Broadly speaking, language is a specific phonetic medium for the communication of ideas, feelings, etc. and these sounds are also encoded in the print medium. Therefore, thoughts or feelings will have their impact on the form and style of the language. Language of love, language of fight, language of literature, language of market, language of poetry, language of science and language of technology etc. is different. Moreover, the language of children is

different, the language of youth is different, the language of less educated and educated people is different.

From this point of view, there can be difference between the languages of science and technology. The aim of science is to describe the truth or fact while the aim of technology is to sell its product. For the use of today's technological product or equipment, the method of its use is also given in writing along with that equipment. Its language must be in the simplest, practical and correct orderly form, otherwise there can be a disaster of meaning. But in this unit, we are considering the language of science and technology in more or less the same form.

The generally found linguistics features found in the language of science and technology are as follows :

7.5.1 Clarity and Accuracy

In all types of science writing, communication has to be kept simple and effective but not at the cost of fact or truth. The meaning of the word simple is also relative. For example, a word or concept that is easy for a scientist may be very difficult for a student. Therefore, simplicity can be done keeping in mind the readership.

Original or classical science writing should be truthful and factual, while there is a proper place for imagination in abstract science writing. But here it is also important to keep in mind that imagination should not become 'fantasy' in this. 'Fantasy' is a different genre of literature.

'Science fiction' can also be considered as a medium of science. It is not necessary that the purpose of science fiction should be to spread the knowledge of science. But science fiction can be used for dissemination of science. The compilation and assessment of facts should also be done from the point of view of truth, not for establishing one's opinion. No doubt, the concepts of truth can also be different; therefore, there is a need to give sources of knowledge expressed in them so that the cited knowledge can be tested when needed.

7.5.2 Objectivity

The subject of science writing is, in short, authentic knowledge of the physical world, and language is the mode of writing. Mathematics is also a language which is considered most suitable for the expression and communication of science. The interesting thing is that for popular science writing, mathematical formulas are as far away as possible, untouchable. The language of most science writing is 'objective' because science itself is objective. While the language of literature is 'subjective' because literature is a self-composition inspired by a creator's own experiences. In the presentation of the story, the writer keeps on giving place to personal point of view or perception. Therefore, subjective expressions like 'I understand', 'I think', 'I think' are seen in literary language, whereas in the language of science there is no place for such personal approach or understanding, unless the scientist-writer has to express his opinion in the form of a conclusion. See the following example of the objectivity of the language of science and technology:

'Shells or armor, bones and other hard parts of organisms are buried in the sand, soil of river beds, bottoms of lakes and seabeds when sediments settle. Water gradually dissolves the basic substances of the organisms and in course of time they are replaced by other substances mixed with it, so that they become hard like stone. Since the hard part of soft and spineless creatures, such as snails etc. is shell or armor, only armor can be left in the residual form by these creatures.

In popular science, there is freedom to use one's own experiences to increase the interest of the readers, provided that the truth and facts are not affected. In science writing, language should enhance its nature for the dissemination of science, because the popular form of language may not be able to communicate new concepts. In science writing, selection of words, formation of sentences and division of paragraphs are done with a view to make subject knowledge simple, interesting and effective.

7.5.3 Use of Technical Terminology

One of the characteristics of science writing is that it requires the use of technical terms. This aspect of science writing is being discussed in detail in section 7.6 of this unit.

Here the question must be arising in your mind that what is Technical Term? You will study read about the Technical Terminologies in detail in MTT-017 course of this M.A. in Translation Studies programme. Here we just want to tell you that technical (definitional) words are those words, which are definable in themselves and which have an authentic-certain meaning in a particular knowledge or field. For example, in the fields of science the words 'atom', 'photosynthesis', 'nuclear', 'radiation', 'atmosphere', 'pollution', 'geocentric', 'microorganism', 'landslide', 'momentum', 'heat', 'bacteria', 'space' etc. are defined in themselves. The characteristic of technical terms is that their meaning is subtle and definite. For example, let us take the word 'photon'. Initially 'photon' was considered as the smallest particle of 'light ray'. But now it is considered to be the smallest particle of any energy ray - be it 'heat' or 'gamma ray'. Now this meaning of 'photon' has become definitional i.e. 'stable'.

Many words used in general use are 'hijacked' by science and given a definite form of old meaning with a limited or sometimes extended meaning. For example, 'computer technology' has given the words 'memory', 'screen' etc. different technical meaning. There are words like 'mouse' etc. which take on new meanings in computer technology.

In the context of language of science, it is also necessary to note that there is sufficient use of technical terms, but it is necessary to explain their meaning keeping in view the level of the reader. For example, they are widely used in 'technical writing' related to science and technology, whereas they are used relatively less in this type of material written in 'popular writing style'. Then the author uses them only as needed, otherwise he can also give a little detail by expressing the technical meaning contained in them.

7.5.4 Simplicity and Easiness

Many thinkers believe that the language of science writing should be simple, it should not be figurative. In order to maintain this simplicity, the words should be used in the subjective sense only. Simplicity has to be kept, but the assumption that words should be used in it only in the literal sense is worth considering.

It is generally believed that the language of science and technology is objective i.e. the words and sentence-forms of this language are seen and understood only in the meaning-context contained in them. Whatever is being said through the language of science and technology, it has the same meaning and not figurative or euphemistic meaning. Science-technology literature is written in simple language. The meaning of the word simple is relative from the point of view of the reader. If creative literature is composed in a language rich in adjectives and euphemisms, then it is considered to be its quality, but the language of science and technology is acceptable only with meaning. On the contrary, the distance of literary language from the meaning becomes the standard of its excellence. For example, see the following quote from science literature written in normative language:

‘Microbiology is the study of those microorganisms that we cannot see with the naked eye and whose size is less than a millimeter. These include cyano-bacteria, many types of bacteria, protozoa, microscopic fungi and unicellular and multicellular algae.’

The presence of epithets and euphemisms can be seen somewhere in the language of science. The development of the language of science and the meanings of words and hence expression also takes place through signs and expressions. But, care has to be taken while using epithets and euphemisms so that there is no confusion in communication.

7.5.5 Factuality and Fixidity/Certainty of Meaning

Integrity, factuality and certainty or fixidity of meaning are of utmost importance in the work of science. Therefore, there is factuality in the language of science and also certainty of meaning. At the same time, instead of factuality in poetry, sentimentality and meaning uncertainty are more important. Neutrality and a kind of ego-negation are also desirable in the language of science, because this quality is essential in the work of science. Niels Bohr told the all-respected best scientist like Einstein, ‘Don’t tell God what to do’ when he said, ‘God doesn’t play dice’. He was so humble in nature that there is no sense of ego in his statement, rather he was saying that there is definitely a cause and effect in the law of God, and not ‘coincidence’. But for those who don’t know Einstein or about him, his words may sound arrogant.

7.5.6 Universality

The laws of science are beyond the limits of country and time, they are universal. For example, the ‘principle of gravity’ expresses the same meaning in all countries and societies. It means that there is no change in this rule due to the change of country and time. Therefore, regular verbs are generally used in its language to express the laws of science. Whenever scientific facts, conclusions, rules etc. are described or the properties of scientific objects are discussed, scientists often use these routine verb forms in their language. This gives the reader a sense of scientific continuity. For example, see the following quote:

‘Radiation also occurs from radioactive elements in nature. All the radioactive elements available in nature disintegrate into other elements at a particular speed. They also emit radiation while disintegrating into other elements generated by themselves. This process of disintegration produces three types of radiations. These three types of radiation are known as alpha, beta and gamma radiations. All radioactive elements in nature must produce one or the other of these three radiations during disintegration.’

7.5.7 Narrativeness

Narrative is the general quality of the language of science. Since factual information about the subject matter of science is communicated through the language of science and technology, this language-form is subjective. This subjectivity of the language of science and technology makes it narrative. On the other hand, the language of literature is generally emotional. This emotional language-form is not subjective but speaker-oriented. While creating literature, the author expresses his feelings, thoughts, emotions so the language of literature becomes emotional, while it is not the quality of the language of science-language. For example, see the following quote from physics expressing declarativeness:

When a neutral atom is placed in an external electric field, both the positive charge and the negative charge in the atom are affected by the external electric field. The positively charged, nucleus is displaced in the direction of the electric field; the negatively charged electrons in the atom are displaced in the opposite

direction. But positive and negative charges attract each other and the atom remains united. If the electric field is large, it ionizes the atom.

7.5.8 Use of specific graphs-symbols etc.

Special diagrams and symbols are used to easily communicate any story, but they are essentially used to express the subject matter related to science in a clear and concise form. Similarly, special symbols are also used in the language of science. $\sqrt{\quad}$, $\pm$, $\approx$, $\propto$, $\sin$, $\cos$, $\tan$, $\cot$, $\sec$, $\csc$, $\log$, $\exp$, $\ln$, $\exp$, $\ln$, $\exp$, $\ln$ etc. are symbols of specific meaning. These symbols are also used in scientific formulas. Formulas are expressions of scientific concepts.

By now it must be clear to you that the language of science has some special qualities. Here we have to keep in mind that the task of science is to discover and propagate true (material) knowledge. Therefore, it is necessary to protect these qualities in science writing. Where it is necessary to protect these qualities in science-writing, they should be maintained even while translating. If these are kept in mind then the correct expression will come in the language of science, in writing and in translation. As far as technology is concerned, since it is the application of science, the same qualities are essential in it.

7.6 Essentiality and Status of Technical Terminology in Science-Technology Text

While discussing the properties with respect to the language of science, we have discussed about Technical Terminology in Section 7.5.3 of this unit. In this part of the unit, we discuss the necessity and status of technical terminologies in science and technology literature.

Generally when we talk or make simple description then we use such words which can have many meanings. Then we can clarify their meaning according to the need, although often in this case unnecessary disputes also arise. When a serious discussion is to be held on any subject, it is very important that the statement is clear and the meaning of the words used in it are also sure, as defined as possible. For example, a layman can hardly differentiate between the words ‘mass’ and ‘weight’. He may think that an object is heavy i.e. it has more ‘mass’. But the scientific fact is that an object of the same mass will feel less heavy in water, less heavy on the moon, and the same can be of zero weight in an orbiting satellite. From the point of view of any scientist, the ‘weight’ of an object depends on its mass, the gravitational force of that region and the density of its sphere, and the mass on the amount of its substance. It is natural that here ‘weight’ has been given a definite meaning. This certainty of meaning is what makes a word definitional.

An important feature of technical terms is that the properties of the object or concept they represent are those particular properties that are present in the same object or concept i.e. in a sense, they make the defined object unique. For example, ‘the gravity force’ is a force that depends on the mass of objects. Now whenever there is a force between objects (which depends on their mass) then that force is definitely gravitational force, there cannot be any other kind of force.

Technical Terminology serves another important function. They give a word for an action or concept. For example, a ‘black hole’ is an object in space in which so much matter has been concentrated in a very small area that due to its gravitational force, no object, even a ray of light, can escape from it, cannot be free. Therefore, it will look black. And since nothing can come out of it after entering it, it has become like a ‘cavity’, although there is no ‘pit’. This wonderful name for the whole concept was coined by John Wheeler in 1968. If you make a hole in the ground and paint it black, it will not be called ‘*Krishna Vivar*’ (Black hole). And

this is another thing that according to the theory of Stephen Hawking, in certain conditions, gamma rays etc. can be freed and radiated from the black hole. For this reason now this name will not be changed.

Serious discussion cannot be done without technical terms. All serious writing is completed by appropriate technical terms. They develop our knowledge and our thinking power. Along with this, they also develop our language. Einstein invented formulas in 1919 to explain his 'Theory of Gravitational Force'. In those texts, Einstein also used a 'cosmic constant' to prevent the universe from expanding so that the universe, he described, was stable. In 1929, when Hubble showed from observations that the universe was not static but was expanding, Einstein struck his head, acknowledging his mistake and removing the 'cosmic constant'. Then all the scientists had also understood that although the universe is expanding, the velocity of its expansion will keep decreasing. Now in 1998, Perlmutter and Schmidt etc. proved from their observations that the universe is not only expanding, but the velocity of its expansion is increasing instead of decreasing. Now again the same 'cosmic constant' is coming back, to explain the acceleration of this expansion!!

The Government of India realized the need that technical terminology is very essential for science communication. He established the 'Commission for Scientific and Technical Terminology' (CSTT) in 1961. After its inception, the Commission started coining technical words rapidly and till a few years back more than eight lakh technical words had been coined in Hindi. This work of CSTT is going on continuously.

It is clear that today the main fundamental work in science and technology is being done in developed countries in their own languages. Since the main fundamental work in science and technology is happening here relatively very less, so we are coining new scientific and technical words very rarely. Developed countries also include Jewish, Chinese and Japanese languages. In developing countries adopting science-technology, due to lack of natural development process of technical terminology, planned development of terminology has to be done through the establishment of government institutions like the CSTT. In the process of this fixed development, the Commission has adopted the technique of taking words as they are, coining new words for them, accepting them in adapted form or translating them and making them part of the language of knowledge and science. You will study in detail about the government's efforts to make technical terminologies a part of their language through such efforts in the course MTT- 017 titled 'Lexicology, Technical Terminology and Translation'.

7.7 Formation of Technical Terms of Science-Technology : Historical Perspective

It is certain that serious discussion cannot take place without technical terminology. The use of technical terms started with the development of knowledge in India about six thousand years ago. In the subjects of philosophy, economics, literature, mathematics etc., the use of technical words had started from the Vedic (Sanskrit) period itself. The tradition of philosophies in that period was that each philosophy or its branch used to give its own definition of special words. The definition of evidence is different in *Sankhya* and different in other philosophies like *Mimansa*. But the special thing was that their definition was sure. Although there are many dictionaries in Sanskrit language, but '*Shabd Kalpadrum*' is such a dictionary in which definitions of words are given, and other information along with them. In science too, the use of technical terms is found in India from the eighth century BC. For example, '*Charaka Samhita*' has a definitional description of diseases and medicines.

‘*Sushruta Samhita*’ of almost the same period has a definitional description of human body parts, surgical instruments and diseases. Around 6-7th century BC, Bharadwaj Muni’s *Vimanshastra*, which is full of thematic scientific definitions, is there.

This development of science and technical words has been going on in India. Therefore, in mathematics, the invention of the decimal method and value in place of numbers could be one. And it is in this tradition that Aryabhata in 500 AD - 1000 years before Copernicus - presents the complete scientific theory of the heliocentric solar system. Similarly, astronomy, chemistry and mathematics etc. have been developing. This could not have happened without the development of technical terms. Till the twelfth century, India was the leader in science and technology in the world, but since then the attacks of barbarians became very intense and India’s scientific progress slowed down.

Boolean algebra was first invented in India in the fourteenth century. Definitions are the cornerstones of this algebra. After this Karnapur, Dalpat Rai etc.’s ‘*Yavan Nammala*’, ‘*Parsik Nammala*’, ‘*Parsi Prakash*,’ ‘*Raj Vyavar Kosh*’ etc. were made in which Sanskrit words were used for Persian words. In the tradition of making a dictionary, in 1707, with the inspiration of Chhatrapati Shivaji Maharaj, Mr. Raghunath Pandit created ‘*Rajkosh*’ in Sanskrit, which contains about 1500 words related to the departments of administration, defense etc.

After some stability in the British rule, they felt the need of translation of English books into Hindustani and accordingly the formation of definitions for technical terms was started. Then Mr. Fantra established a translation committee in England in 1809. Dr. Maxinan, Dr. Gervais, Dr. Springer and Prof. Bates made important contributions in this direction. At the same time, Indians also started such translation work. A translation of Abul Fazl’s ‘*Aine Akbari*’ from Persian to Urdu with commentary by Sir Syed Ahmad Khan was published in the second half of the nineteenth century. ‘*Asbab-e-Bagawat-e-Hind*’ written in Urdu by Sir Syed was also translated into English. With the efforts of ‘Scientific Society of Aligarh’ established by him, science related books were translated from English to Urdu. In 1871 the Government of Bengal set-up a committee to translate from English into Indian languages. Under this, Rajendra Lal Mitra wrote an essay titled ‘A Scheme for the Rendering of European Scientific Terminology into Vernaculars of India’. This essay is the first attempt in modern India in which the theory of technical terminology formation has been discussed in detail. But the government did not welcome it and gave freedom to everyone to translate according to their own understanding.

In 1888, under the patronage of Baroda King Maharaja Sayaji Rao Gaekwad, the technical terminology formation in Gujarati was done by Prof. Tribhuvan Kalyandas Gajjar. Prof. Gajjar also published five books on science in Gujarati. Similarly, an effort was also made by ‘Bangiya Sahitya Parishad’. In 1898, ‘Kashi Nagari Pracharini Sabha’ established a committee for this work in Hindi. Glossaries on various subjects of science were published in the next eight years under the editorship of Babu Shyamsundar Das. It started with the publication of ‘*Hindi Scientific Glossary*’ in 1901. As a result of these efforts, the book entitled ‘*Chemistry*’ written by Mahesh Charan Singh Pandey came to light. Then ‘Scientific Terminology’ (1930) and ‘English-Hindi Scientific Dictionary’ (First Volume 1948, and Second Volume 1950) composed by Allahabad’s Dr. Satyaprakash were published. ‘An English-Gujarati Glossary of Scientific Works in Nagari Script’ under the leadership of Popatlal Govindlal was published. In 1948, Daate and Karve’s important ‘*Shastriya Paribhasha Kosh*’ was published. During this period, voluntary organizations and individuals like Pt. Sunderlal; Dr. Jafar Hasan; Hindi Sahitya Sammelan, Prayag; Osmania University; Hindustani Culture Society etc. continued to do important work of translation and terminology.

Dr. Raghuvver's 'The Great Indian Dictionary' was published in 1943-48. In 1955, 'Comprehensive English-Hindi Dictionary' was published by them by giving further expansion to it. This work of Dr. Raghuvver was not only vast but also a standard work and his words could easily be taken in most of the Indian languages as they were based on Sanskrit. Taking advantage of the amazing ability of Sanskrit to create new words, he created new Sanskrit terms for scientific terminology. He prepared two lakh words by classifying all branches of knowledge into 600 branches. This was such a powerful work that only on its strength Hindi could be declared worthy of science communication. This work proved that Indian languages, and Hindi in particular, have the capacity to express the most advanced scientific concepts. But, the supporters of English and Hindustani opposed it.

The Nizam of Hyderabad established a Bureau for the formation of technical terminology on the basis of Urdu. Pt. Sundarlal and Hindustani Academy also worked in the opposite direction of Dr. Raghuvver. Thus, the formation of technical terminologies became a controversial topic. By that time, three streams were flowing separately - pro-Sanskrit, pro-Urdu and pro-English. After becoming a republic, the Government of India established a 'Scientific Terminology Board' in 1960. When this Board was not able to do anything special due to the conflicting streams, then in 1961 the 'Commission for Scientific and Technical Terminology' (CSTT) was established under the chairmanship of Dr. Daulat Singh Kothari. First of all, Dr. Kothari prepared a 'philosophy' with the consent of all the scholars for the formation of technical terminology and then the work of formation of technical terminology started. In spite of many restrictions while walking on the path told by him, the Commission has definitely done a work worthy of praise. The Supreme Court of India in one of its judgments has established the necessity of using the technical terminology created by the Commission. The Court has said that at all-India level only the technical terminology prescribed by the Commission should be used.

7.7 Let Us Sum Up

The importance of science (and technology) in today's world is undeniable for economic progress, prosperity and power, military power and for increasing the quality of life. Therefore, the country needs to move forward for more development in science and technology. If this is not done, the country will remain a follower of the developed countries.

Creating scientific knowledge requires scientists and appropriate resources. Science is a subject of global cooperation, so the knowledge of the scientific work being done in developed countries is equally important. No working scientist can become a translator of all the languages of the world. Therefore, translators are essential for translation of science and technology literature. Without the translation of science into Indian languages, this country cannot become a knowledge power, cannot become an economic power and a military power, and cannot protect its identity. In the light of this, it is necessary to understand the concept of science-technology and to know about its translation. Therefore two units have been focused on these topics. Out of these, by studying this unit, you would have got an idea of various dimensions of science-technology literature like meaning-nature, types, language as well as its technical terminology and its present status and history. In the next unit we will focus on translation of sci-tech literature.

7.10 Exercises

1. Explaining the meaning of 'Science' and 'technology', give its relation with language.
2. Explain the types of science-technology literature and the nature of its writing.

3. Discuss with examples the features of the language of science and technology.
4. Explain the necessity and status of technical terminologies in science and technology literature.
5. Give a brief history of technical terminologies related to science and technology.

7.10 Suggested Readings

- *Vikassheel deshon mein Anuvad Ki Samasyaen* (Problems of Translation in Developing Countries), New Delhi, 1967.
- *Anuvad Kala : Kuchh Vichar* (Art of Translation: Some Thoughts), Anand Prakash Khemani and Ved Prakash (Eds.) S. Chand and Company, New Delhi, 1964.
- *Vaigyanik Sahitya Ke Anuvad Ki Samasyaen* (Problems of translation of scientific literature), Dr. Bhola Nath Tiwari (Ed.) Shabdkar, Delhi, 1986.
- *Anuvad Vigyan : Siddhant Aur Anuprayog* (Science of Translation: Principles and Applications), Dr. Nagendra (Ed.), Directorate of Hindi Medium Implementation, University of Delhi, Delhi 1993.
- *Anuvad Vigyan : Siddhant Aur Anuprayog* (Science of Translation: Principles and Applications), Dr. R.N. Srivasatava and Dr. Krishna Kumar Goswami, Alekh Publications, Delhi, 1985.
- *Rajbhasha Hindi Mein Vaigyanik Sahitya Ke Anuvad Ki Dishayen* (Directions of translation of Scientific Literature in Official Language Hindi), Dr. Harimohan, Takshashila Prakashan, New Delhi.
- *Anuvad: Soch aur Sanskar*, Dr. Sohan Sharma, Sanmati Prakashan, Mumbai, 1984.
- *Anuvad Shatak* (Part 1 and 2), Ed. Neeta Gupta and Dr. P.C. Tandon et al, Bhartiya Anuvad Parishad, New Delhi, 2001.
- *Paribhashik Shabdavali Ki Vikas-yatra* (Development Journey of Technical Terminology), Dr. Gargi Gupta (Ed.), Bhartiya Anuvad Parishad, New Delhi, 1986.
- *Paribhashik Shabdavali : Kuchh Samasyaen* (Technical Terminology: Some Problems), Dr. Bhola Nath Tiwari and Mahendra Chaturvedi (Eds.), Shabdkar, Delhi, 1978.

Unit 8 Literatures of Science-Technology and Translation

Structure

- 8.0 Objectives
- 8.1 Introduction
- 8.2 Translating Literature of Science-Technology : Need and Relevance
- 8.3 Stages of Translation-Process of Science-Technology Literature
- 8.4 Challenges of Translating Literatures of Science-Technology
 - 8.4.1 Expectations of Appropriate Subject-knowledge
 - 8.4.2 Problems of Technical Terminology
 - 8.4.3 Problem of Selection of Appropriate Equivalents
 - 8.4.4 Expectations of Subject-oriented Expression Style
 - 8.4.5 Problems of Translating Formulas, Equations, Symbols and Abbreviations etc.
 - 8.4.6 Translations of Units of Weights, Measurements and Physical Quantities
 - 8.4.7 Rationale for Translation/Transliteration of Bibliography
 - 8.4.8 Problems of Common Hindi Names of Objects-Substances etc.
 - 8.4.9 Scarcity of Reference Literature
 - 8.4.10 Issues pertaining to Time and Space
- 8.5 Let Us Sum Up
- 8.6 Exercises
- 8.7 Suggested Readings

8.0 Objectives

After going through this unit, you will be able to:

- understand the need and significance of translating science-technology literature;
- learn the stages of translation-process of science-technology material; and
- know the challenges of translating science-technology literature.

8.1 Introduction

Literature related to science and technology is the basic literature of knowledge. We get this literature through original writing, translation and adaptation. Science and technology literature can be technical in nature and written in a style popular with the general public. Along with this, the use of technical terminologies and some other qualities in the language of science and technology literature also give it uniqueness. We have discussed all these aspects of science and technology literature in detail in the previous unit.

In this unit we will learn about the need and significance of science and technology literature and what are the steps in the process of its translation. Apart from this, you will also get detailed information about the challenges face by translators while translating science and technology related literature.

8.2 Translating Literatures of Science-Technology : Need and Relevance

In today's era, science and technology are being incorporated at a rapid pace in different countries of the world. The vision of scientific progress and development is emerging in every field of life. In particular, if we compare the scientific progress seen in the early years of our own life with that of today, the vision is quite clear. The by-product of this progress is

that there is a lot of scientific literature being generated. Due to the rapid pace with which research, experiments and tests are being done in the field of science and technology. No country is self-sufficient in terms of science and technology. The reality is also that no developed or developing country can make its overall development only by taking shelter of the scientific and technological knowledge developed by itself - it could not refrain from understanding and accepting the development happening in this field in other countries. Their aim remains to acquire new scientific and technical information, which is not possible without translation. Dr. G. Gopinathan has even called the translation of science and technology literature to the foundation of modern knowledge. He has written in his book '*Anuvad : Siddhant Evam Prayog*' (Translation : Theory and Application) that 'Transfer of scientific information of different nations of the world is a very important task, scientific and technical translation has become the foundation of modern knowledge-science.' (p. 37)

The question also arises here whether there is professional pressure in the demand of this translation or whether the inner motivation of the translator works. The reality is that in the root of this type of translation, instead of inspiration and professional pressure, the internal need of scientific-technical literature works. Dr. Ritarani Paliwal, underlining this intrinsic need and specialty of translation in her book '*Anuvad Ki Samajik Bhoomika*' (Social Role of Translation) it is written that 'Translation of scientific and technical subjects is the most demanded translation of today's era. As the importance and need of science in life has increased, the need for translation in this field has also increased. What is unique is that translation is an intrinsic need of the field, not an impulse or professional compulsion.' (p. 177)

Today, it is difficult to outline the scientific achievements of developed countries. Scientific knowledge developed by different countries is available in the form of literature written in the language of that country. But it is absolutely necessary for every country to increase its knowledge and to keep itself constantly moving on the path of development and to maintain a constant connection with the developments taking place in the field of science and technology of the world - even for the developed countries. Because the ultimate goal of science is related to its relevance or utility for man and society. Science and technology can be considered synonymous with physical development and growth. It has been seen in this regard that like the difference in progress in the field of science and technology in developed and developing countries, there is a great difference in the percentage of creation of basic science literature.

Science literature helps in bridging that gap, getting acquainted with the latest achievements of knowledge by the developing countries and making further technological development. In such a situation, the question arises that how is this help possible? In search of the answer to this question, we find that it is possible to get acquainted with the latest science literature, acquire its knowledge and update our knowledge through it only in two ways. These are - (1) the person should have familiarity or knowledge with a particular language; Or (2) science-technological literature should be brought in our own language through translation. No one person can become a knower of all languages. In such a situation, it is natural to be inclined towards the second option.

The need for translation of science and technical literature can also be seen in the context of those languages in which the tradition of science and technology literature writing has not been fully developed. This appears to be particularly applicable in the context of developing countries because they are lagging behind in scientific thinking and analysis, whereas in developed nations, the original science writing continues to be done in the language of that

country. Due to this, where science literature is enriched, the language also develops and ultimately the tradition of science-technology literature writing gets strengthened. Whenever there is some new scientific and technological development or a new situation is created in the present field of science-technology, then related vocabulary and linguistic usages also develop in a particular language. On the other hand, by translating science-technological literature published in other languages into our own language, our language-literature is enriched from the point of view of science-technology literature. Language also develops according to their expression. While the role of translation is important in the development of the language, at the same time, at its core, the sense of encouraging science writing in one's own language is also more prominent.

In technologically advanced countries, basic science-technological literature is mostly available in languages like English, German, French, Russian, Japanese etc. Due to this, people have a perception that only a few major languages have the ability to express science-technology concepts. While this cannot be considered literally true because no country - whether it is a developed country or a developing country - cannot do its overall development only on the basis of its developed science-technological knowledge. The developed countries of the world have their own rich literature related to science and technology. But they also have to accept the need to understand and assimilate the developments taking place in other countries and languages. At the core of this, their basic goal is to get acquainted with the latest achievements of knowledge, to get the latest science-technological information. The need is to be able to take advantage of the various tools of other developed languages. In this situation, translation become a powerful medium to make science literature available in their language.

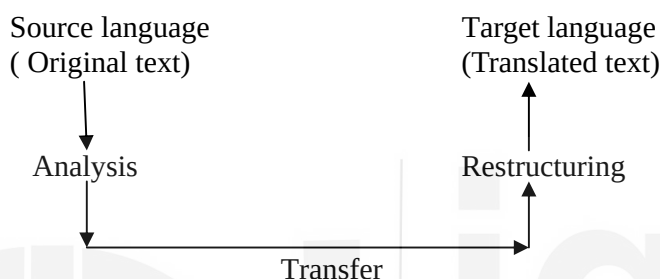
The science-technologists of India are mainly engaged in research work in the field of science-technology through the medium of English. For this reason, translation seems to be the only way for a multi-lingual country like India to connect with its own scientists-technologists etc.

As far as the tradition of science-technology literature writing in India is concerned, only its weak stream seems to be flowing. There is a lack of this type of original literary creation in Hindi. Only certain sections of people in India understand English better, otherwise most of the people understand Hindi (or regional languages). In such a situation, translation is a powerful medium to make science literature available in Hindi.

Only by taking the world's science and technology achievements to every corner of the country through translation, we can pave the path of progress in true and real sense - we can make India a scientific and progressive India of the 21st century. In today's scientific era, the need for science and technology translation is increasing day by day, but the percentage of translation of such literature written in different languages of the country and abroad will be said to be very less from any point of view. Due to the absence of modern science-technological literature, Hindi and especially modern Indian languages have lagged far behind in this direction. The need today is to develop a scientific way of thinking among the people and give them as much scientific information as possible. It is the demand of the hour and it is also a social responsibility that there should be writings related to science and technology in Indian languages so that the knowledge of science can be provided to the people in their own language. Along with this, those who create and translate this type of literature should get proper prestige and respect.

8.3 Stages of Translation-Process of Science-Technology Literature

While translating any type of material including science and technology, the translator has to go through various stages. While translating, where the translator plays the role of ‘original reader’, he also plays the role of ‘bilingual’ and ‘author’ of the translated text, in order to preserve the meaning of the text and give expression to it in another language. It is a ‘Process Approach’ to translation that helps the translator to understand the mental processes underlying the translated material. You will study about the ‘Process of Translation’ in detail in MTT-019. Here we would like to inform you in brief that the famous translation theorist Eugene A. Nida has considered three stages in the translation process – (a) analysis, (b) transfer; and (c) reconstruction. He has explained this process with the following diagram :



This is a common process of translation of any kind of literature. This process of translation may broadly consist of the following stages :

- Before starting the translation work of science and technology, to study the whole material (i.e. chapter or section) as a whole so that the related subject is understood. In the event of not having complete knowledge of the related subject, the related literature should be studied in the source language and the target language so that there is no ambiguity in the understanding of the subject. This type of thinking brings excellence in translation. In case of any kind of ambiguity, confusion can be removed by the language and subject-experts.
- It is necessary for the translator to have a glossary of the subject area related to the translated material and bilingual dictionary.
- Underlining the difficult and technical words found in the translating material and their equivalent should be decided. Sometimes multiple meanings and connotations are available for the same word. In such a situation, the translator should have the ability to select appropriate and accurate equivalent, otherwise there will be a possibility of loss of meaning.
- Read each paragraph of the translating material carefully and understand the meaning and after that translate it. Science-technological translation should not be literal but should be expressive and simple words should be used in it. This enhances the quality of translation and makes it easy to understand. When starting a translation, the idea is always to translate the source language material word-for-word, or to translate sentence-by-sentence, or to translate the entire paragraph at once. It is meant to say that what is to be considered a ‘**Unit of Translation**’ - a word, a sentence or a paragraph.

Some translators are in favour of translating words and certain sentences and some scholars consider the paragraph as the unit of translation. Although each word has its own importance in science and technology writing and there is no possibility of redundancy or repetition in it, but this trend is not consistent because it keeps the possibility of word-for-

word in the form of literal translation. As far as the sentence is concerned, it is the means of expressing the meaning and sense in the language in a systematic form. When words become part of a sentence, a special meaning is transmitted in them. From this point of view, it seems reasonable to consider the sentence as the Unit of Translation. However, when translating science and technology content, considering the sentence as the unit of translation, the original meaning may not be understood properly and may lead to imitation of the style. In this case, the translation can also be converted into a single sentence. At the same time, there can also be a possibility of neglecting the precedence order of the sentences. While considering the paragraph as a unit, according to the nature of the target language, the translation of the sentences can also be presented appropriately by dividing them into two or more sentences so that meaning-consistency is established. At the same time, ease of expression and interestingness-simplicity should also come in the language. All material should be translated on this basis. But, if the sentence is translated as a unit of translation, then it is expected to take care of the order of the sentences and according to the nature of the target language, the sentences can be translated by dividing them into two or more sentences if necessary. With this, meaning-consistency is created in the sentences and at the same time ease of expression and interestingness-gluttony-simplicity also comes in the language. In fact, syntax is a great asset of a skilled translator. But where the translator does not find the translation suitable, he should finalize the translated content after discussing with subject-experts and language-experts.

Selecting the language and style of translation according to the target audience. The language of translation should be pure and there should be no mistakes related to spelling etc.

- To resolve the correctly marked places, the cited text should be compared with the original books etc. and the equations-formulas, chemical symbols, tables-pictures etc. should also be matched well with the original.
- For correction of spelling and syntactical errors, the translated material should be self-edited at least once, so that the translation can become smooth and up to the mark.
- The translated material should be vetted by another person. After vetting, the translation takes a completely flawless and in standard form.

Science and technology material can be translated by adopting the above process. Translating this type of material requires a good command of the source and target languages by the translator. The knowledge of the source language of the translator should be so rich that he can identify with the original author. The richness of the translator's knowledge of the source language should not be limited only to linguistic knowledge but should also depend on a deep hold on 'language-empathy'. This language-empathy of the translator is natural and he gets it easily, which he enriches through reading and practice in source language. At the same time, basic knowledge and keen insight of the particular subject is also desirable in the translator i.e. a good grasp of science subjects is also expected. When the translator makes clear and proper expression in his language by relying on language-empathy and a good command on the subject, then such translation becomes entitled to be called meaningful translation. But in practice, finding such type of qualified translators is not an easy task. Therefore, due to the diversity in the required capabilities of the translator for science and technology text and the diversity of the purpose of translation, diversity is also seen in translation.

8.4 Challenges of Translating Literature of Science-Technology

There is a special kind of tightness in the language of literature related to science - where there is a special urge to convey more information in minimum words. There is also the absence of unnecessary words-phrases and contexts in the science-technology material. In the language of science-technology, the characteristics and features like objectivity and narrative, precision and certainty from the point of view of the meaning of terminology may make such text seem simple, but the reality is that translation of scientific material is not an easy task. Although it is true that due to the simplicity of expression, style and semantic structure in science literature, the translator does not have to deal with equivalence at the level of style. But due to the fact-predominance of science and technology literature, the problems of its translation are somewhat different. It is an accepted fact that due to the basis of scientific information and information being based on solid evidences, the rules of science are universal or eternal. Universality of rules gives scientific culture the form of universal culture. The development taking place in the field of knowledge and science in countries of the world with different language-culture, instead of breaking the scientific culture, keeps on making the same conclusions based on truths everywhere. Although this universality of scientific culture gives the language of science technology a form of universal language, but this concept has not received wide and firm recognition. For this reason, translation of science and technology literature and its related problems arise, which are expected to be considered seriously. The major challenges faced by the translator in the translation of science literature are as follows :

8.4.1 Expectations of Appropriate Subject-knowledge

A person doing translation work of any type of material should not only have a good knowledge of the source language and the target language, but he is also expected to have a good command over both the languages. While this criterion applies to literary translation, it also applies to scientific-technological text translation.

While translating literary text, only proper knowledge of both the languages (i.e. source language and target language) proves helpful to the translator. But as far as the translation of science and technological material is concerned, the translator not only needs to know the source language and the target language, but it is essential to have proper, wide and comprehensive knowledge of the subject. Only after having detailed, proper and practical knowledge of all aspects of their applied processes in the form of science-based principles and technology, the translator will be able to understand the translatable material well and translate it correctly in simple and clear language. In the translation of literary works, where the translator is particularly concerned with the structure and form of the language, the person translating science-technology related material mainly focuses on the subject matter.

While translating science-technology material, the translator's attention is focused on the accurate presentation and accuracy of the most relevant information. If the science and technology translator deviates from the original texts expressed in the subject matter, then this deviation is a mistake and it can never be forgiven. On the contrary, while translating a story-novel, drama, poem etc., the translator of literary text can take the liberty up to some extent.

On the other hand, if a person who is well-versed in both the languages but ignorant of the subject tries to translate science and technical material, it may lead to misleading transfer of scientific factual information in target language. In other words, the possibility of error may remain. For example, if a word 'salt' appears in a science material related to the subject of chemistry, a translator without knowledge of the subject may understand it a thing to be used

in preparation of food etc., whereas a translator with extensive and practical knowledge of the subject may know that like other chemical salts, it is 'an acid free of hydrogen either wholly or partially'. In fact, it is the compound form of 'sodium' and 'chlorine' (i.e. sodium chloride).

In such a situation, sometimes even ridiculous mistakes are made. Like the word 'apple' is used in English for the Hindi word 'सेब' (i.e. one type of fruit). If the translator is not a scholar of science and technology and a word that comes in the original text on science and technology, he will treat them as one type of fruit and use its Hindi equivalent, while a scholar of science and technology would know that it is the name of an artificial satellite of India.

This means that only the knower of science and technology can do the work of translation of science literature. If we accept this position, it would require proportional representation of translators. In such a situation, there will be a shortage of translators for science and technology subjects. Today there is a practical difficulty related to the lack of translators who know the language and the subject. While there is a problem of subject-knowledge with translators with little knowledge of the language, the problem with science subject-experts is that they do not have as good a command over target language (e.g. in Hindi) as is expected from a good translator.

The fact to consider is whether it is not possible to get rid of this problem at all? To face such a problem, it would be better to get the translation done by a person well-versed in the subject, and then the translation should be vetted by the knowledge of the source language and the target language expert from the point of view of language, linguistic devices and stylistics. It means, with the mutual cooperation of subject-experts and language-experts, such a situation can be faced. If the opposite facility is available (i.e. first translation done by the language-knowing person and then get the vetted by the subject-expert), then that can also be used. In this way, the translation of scientific-technical literature done in a co-ordinated manner will be relatively better.

In nutshell, it can be said that in order to deep penetration into the field of scientific and technological translation, the basic knowledge of the subject-specific is not only necessary for the translator, but the deeper and more subtle the knowledge of the subject-specific, the easier it is for translation work. Sustenance will be as simple as that to the said translator. Along with basic knowledge of science, keen insight of the translator is also desirable in this translation. Literal translation of science and technology material can never be accurate and successful. The accurate transmission of the translated content is the main concern of this translation. And to imbibe this sense of origin properly, subject-specific basic knowledge is desirable. In the absence of scientific knowledge of the translator, there is a high possibility of not only a disaster of meaning in the translated material, but also of serious factual mistakes. In this situation 'Cooperation-proven Translation' is the best solution.

8.4.2 Problems of Technical Terminology

Although technical terminology plays an important role in all types of translations, but due to the abundant use of technical terminology in science and technology literature, the use of technical terminology is most important in their translation as well. Therefore, it is necessary for the target language to be rich in terms of technical terminology. This problem related to science and technology translation is multi-dimensional. There is so many dimensions are related to this problem like formation and development of technical terminology, its acceptance, standardization, social acceptance, popularity and stabilization as universal terminology by proving it as a standard technical term etc.

Due to their definitionality, Science and technical subjects are different from literary subjects. The reality is that it is because of the terminology that a subject is kept in the science-technical category. Technical Terminology is an important part of science and technical literature. This is the foundation stone by taking whose support the science-technical literature can become expressive. In order to transfer the scientific-technical content of one language to another language, the first requirement is to enrich the technical terminology of the target language.

In fact, until any language is not endowed with technical terminologies related to various subjects of knowledge, science-technology etc., translation work in that language cannot be done smoothly. But in the language where there is lack of technical terminology or it is insufficient, there are problems in translation of science and technology material. In the context of India, the noise of lack of technical terms is heard. Although remarkable works have been done at the individual and institutional level for the formation of technical terminology here, but there has not been any rich tradition of rich technical terminology.

After the attainment of independence, the Commission for Scientific and Technical Terminology was established under the Ministry of Education, Government of India, for the formation of technical terminology at the pan-India level. Terminology related work has been done by the Commission on a large scale and is still being done. But an updated adequate terminology remains to be created. The practical difficulty is that translators and scholars seem to lack the mindset to adopt this terminology. Emaciated tradition of words and terminology of science and technical subjects can be seen in the background of these reasons. It is also necessary to add updated terms to the glossary.

In this context, it can be said that terminologies have an important place in science-technology literature and the certainty of their semantics creates difficulties for the translator. Due to the progressive development of knowledge, finding or coining equivalents of ever-increasing scientific-technical terminology poses a challenge to the translator. For this reason, a translator of science-technology literature should have a good command over the source language and the target language, as well as have a good understanding of the subject matter and technical terms related to it. On the basis of this, its proper use is expected.

8.4.3 Problem of Selection of Appropriate Equivalents

The translator of scientific and technical material should have knowledge of the subject and should use the terminology prepared by the Commission for Scientific and Technical Terminology (CSTT) of Government of India. At many places, the Commission has given more than one Hindi equivalent of a technical word in English. Due to this, during the translation, there is a situation of confusion and the translator does not understand which synonym should be used in particular context, because there is a possibility of the distortion of meaning in the translation due to the wrong selection of alternative.

During the translation work, the translator should rely on 'context' while facing the problem of alternative selection. 'Context' is the main and fundamental basis of determination of equivalent. Understanding the context makes it possible for the translator to decide which one is the correct and correct alternative.

Thus, it is clear that a translator while translating any material, and especially science-technology material, has to deal with the problem of availability of various alternatives and the choice of appropriate alternative to be used in the given context so that the translation conveys proper meaning and distortion of the meaning can be avoided.

8.4.4 Expectations of Subject-oriented Expression Style

In science-technological writing, subject-matter is given more importance than language-style. The clarity, completeness, accuracy, simplicity and unambiguity is the language-style of this literature. It is an essential requirement for science-technological writing. These qualities give it a separate existence from creative literature writing. Unlike literary language, scientific-technical writing does not use metaphor-sarcasm; words and sentence forms of scientific-technical language are always denotative. Scientific literature is factual or subject-oriented and the main thing in it is 'what is said'. In this type of material, the method of 'saying' is often simple and for this reason, the question of the specialty of the style in the presented ideas remains secondary i.e. the subject is the main and the style is secondary. The science and technical literature writer walks with the aim of spreading knowledge. For the achievement of this intention, he adopts the general language-style in his writing so that he can clearly present the intention in front of the reader.

On the contrary, creative literature is sentimental or emotion-oriented and along with the inclusion of imagination and emotion, an attempt is also made to maintain stylistic aesthetics so that the reader of the composition is fascinated by the style of the creator at every step. The expression of the text plays a special role in creative literature. The whole effect of 'what is said' in creative literature depends on the fact 'how or in what manner it is said'. For example, in the creative literature writing, a lot of style-based aesthetic devices (like image, figurative use of language, Myths etc.) are taken, whereas in science literature, their presence is almost negligible. Linguistic obscurity i.e. distance from the denotative meaning, makes the literary language effective, gives specialty to creative literature. In the language of science and technology literature, this type of figurative use is the sign of the biggest bad quality. Science-technology is not studied for entertainment and enjoyment like creative literature.

Science-Technology literature is created in order to acquire knowledge and keep it updated. For this reason, the facts are presented in this writing in a complete, accurate and unambiguous language with simplicity and clarity. For example, in the language of science and technology, a 'Computer is a machine that takes information, processes it, systematically investigates and provides useful information.' Or, according to the writings on Physics, 'The whole atmosphere gets illuminated during the day due to the scattering of solar light by the dust particles present in the earth's atmosphere.' Or in Mathematics, 'Graphic positional science is that branch of positional science in which the position, condition, and magnitude of forces are represented by straight lines and unknown quantities are known only by measurement.' In this way, it can be said in a nutshell that style is secondary in science literature and in creative literature, the integral presence of both contemplation and aesthetic sense is expected.

The same situation exists in the translation of creative literature and scientific literature. It is not a mandatory requirement to reflect the artistic style of the original work of scientific-technical literature in the translation. The translator should present a simple accurate translation of the original. Since the centre of science and technology literature is 'idea', the translator should keep his vision focused on the same and emphasize on the protection of basic expressions. A UNESCO publication emphasizes this idea by saying that the basic principle of technical translation is to translate ideas or expressions, not words. In this, special emphasis has been placed on the fact that it is the duty of the translator to clarify the things of the original which are clear to the scholars of the original language-speaking region and which are not clear to the target language-speakers :

'This committee also endorsed the statement put forward in the preliminary paper that a technical translation, to be satisfactory ought, where necessary, to be better

than the original. By this is meant that obscure points in the original, those which are not elucidated in sufficient detail because in the country of origin they are common knowledge, should be cleared up in the translation and suitably amplified, either in the body of the translation or in a footnote clearly labelled 'translator's note.' (Scientific and Technical Translation, UNESCO, 1958, p.32)

Thus, it can be said that accuracy and clarity are more important in the translation of science and technology literature. This fact should be applied literally to the translation of scientific-technical literature written for subject-specialists. But if the science-technical literature has been written for the general public i.e. the general reader, then it is expected to pay more or less attention to the style of expression in the translation. It is meant to say that in the translation of 'popular science literature', along with ideas and facts, expression style is also important.

If aesthetic elements are present in science-technology literature, efforts should be made to present an equivalent presentation of this stylistic beauty in translation. While doing this, there should not be any kind of distortion on the subject-related equivalence and authenticity of the facts. Whereas the literary translator has to focus on the artistry of style more or less as much as the original author. Therefore, it is said that the translated work of science literature should have the ability to convey ideas intelligibly and the ability to create the same flavour as the original work.

In the translation of science and technology literature, the translator should use very simple and denotative language. It should be so clear and complete that the subject-related reality expressed in the source language text is received by the reader of the target language unchanged and in its entirety without any difficulty. The words of scientific and technological works are just a medium of exchange of ideas. Therefore, the translator should use simple and unambiguous words as much as possible. Along with this, he should also follow the uniformity of word-selection i.e. the particular word should be used in the same sense throughout the translation.

The linguistic problem of translation of science and technology literature is also related to the syntax, because in the vocabulary of the subject, where the central meaning is contained, the meaning of the words used is realized through the sentences. There is a logical development of the subject matter in the form of fact-idea in the sentence. The syntax of each language has its own specialty. The translator may get confused with the syntactic pattern of the original text and may unknowingly try to follow the same syntax. On the other hand, if it is not compatible with the syntactic nature of the target language, it may lead to confusion in the language. In this context, Alexander Fraser Tytler's view is noteworthy that 'if the tendency and innate nature of all languages were the same, then the process of translation from one language to another would be very easy because in that case the translator would only have to exercise a little care and accuracy and there was a need to pay attention towards factual similarity. But the reality is not like this and there is clearly a lot of difference in the tendency and innate nature of different languages. For this reason, the general opinion is that the translator should properly express in his own words after assimilating the thoughts of the author, paying sufficient attention to the meaning and sense of the original. It is the responsibility of the translator not to disturb the syntax or natural tendency of the translated language. For this, he should make more or less changes in the syntax or phrasing as per the expectation so that the expressions expressed in the original composition can be expressed as clearly and unambiguously as possible and the translation can become more natural, readable and comprehensible.

In fact, it is a challenging task for the translator to translate the expressions and ideas expressed by science and technology literature in simple, clear, complete, accurate and unambiguous language style because the effect of the words and syntax of the text can mislead him. Due to this, there is a possibility of distorting the natural tendency of the translated language, ending its naturalness, and due to complex syntax system, there is a possibility of difficulty in the language. As a result, the communicative competence of the language is hampered. Therefore, it is necessary for the translator to be free from their influence, only then the natural tendency of the translated language will be maintained. Neither the display of literary style-skills is expected for the translator of science-technical literature, nor to mislead the original meaning by giving place to one's interest and personality in translation. It is only a means of disseminating the achievements-concepts etc. of non-linguistic science to the speakers of the translated languages.

8.4.5 Problems of Translation of Formulas, Equations, Symbols and Abbreviations etc.

In science, knowledge is gained by studying nature and natural objects through tests and experiments. This study is based on ongoing logic-analysis, tests and experiments, while it also contains the quality of formulation and subtlety. Along with the intensification of the study of knowledge and science, the related studies also move from simplicity to complexity, they get more and more subtle. As a result, the quality of brevity and conciseness is also included in the language of science. Although, brevity can be the quality of the language of every subject, but there is no place for formulation of thoughts in social science subjects like political science, history etc. In the language of science, there is an urge to present maximum facts and ideas with clarity in minimum words, in a concise language style. In short, it can be said that chemical signs, symbols, formulas and equations etc. have special importance in science and technology literature.

In the light of the government's efforts in the context of formation and development of scientific-technical terminology, it has been seen that due to adoption of international words like compounds and elements, instead of transliterating them while translating, they are used in original form. Therefore, it has to be written as it is instead of translating them. But the Hindi equivalent words of elements like iron, lead, gold, silver, sulfur etc. are available in our languages. But their Hindi equivalents can be accepted in non-scientific context or in general practice and the rest of the names can be accepted as it is. In fact, instead of coining the terminology of elements and compounds, they have been accepted as they are. But as far as symbols of these (like Zn, H₂, H₂O, SO₄, Hg, C, Ag, As) are concerned, they will remain in Roman. Such scientific elements will not be transcribed or written in detail.

It is meant to say that instead of expressing fixed points, mathematical formulas, chemical formulas, equations etc. should be taken as they are written in Roman script.

The brevity related quality of the language of science is matured through abbreviations. Abbreviations can be seen being used in the fields of knowledge and science and in common life-behaviour, but they have a special place in the language of science. An abbreviation is an abbreviated (abridged) form of any word. Abbreviation gives the impression of its broad meaning in its visible and audible short form. In this, full meaning is expressed by short-words or short-letter configuration. Abbreviation can be defined in these words, the systematic and well-planned abbreviation of noun units consisting of one or more words, this word is called 'Abbreviation' which, without explanation and clarification, has a definite meaning in writing and speaking. Thus, the ideal abbreviation contains the qualities of brevity as well as unambiguity and clarity. The translator also has to deal with the translation of abbreviations. For this he has four options available

- a) Presenting the Hindi translation of the abbreviation in target language in abbreviated form.
- b) Write the full form of the abbreviation instead of writing the translation of the abbreviation.
- c) Transliteration of abbreviation in target language.
- d) Transliterate the abbreviation and give its full form in brackets in target language.

In the language of science, brevity and subtlety are maintained for clear and unambiguous rendering of the content or subject matter. While abbreviations are used for the discharge of brevity and subtlety, diagrams, special symbols and pictures etc. are also used extensively. In the presentation of the content, these devices play a complementary role to the literal interpretation. These symbols-diagrams etc. are very important in rendering any complex concept in a simpler form. For example $\square, \sqrt{\quad}, \pm, \approx, \leq, \geq, \propto, \neq, \mu, \pi, \omega, \beta, \theta$ etc. marks can be seen. These symbols are used in a formula with a specific meaning. For example, the first sign is intended to denote the sense 'is equal to'. Similarly, symbols like alpha, beta, theta, omega, line, cosine, tangent, log, etc. can be seen in the number symbols of other branches of mathematics and science. Since these types of symbols used in science and technology literature have gained international form, they should be used in the same form in translation, using them in accordance with the original.

8.4.6 Translations of Units of Weight, Measurements and Physical Quantities

Where chemical symbols, symbols of mathematics and other branches of science, formulas and equations etc. are very important in science material, the units of weight, measure and physical quantity also have their own specialty. For this reason, it is necessary to consider the translation of units of weight, measurement and physical quantity.

'Kilogram' etc. for weight in, 'Meter' for length, 'Calorie' for unit of heat, 'Dyne' for force, 'Litre' for fluidity, 'Ampere' for current, 'Ohm', 'Watt', 'Joule' are units of measurement. Other similar units of measurement are 'barrel', 'celsius', 'cubic meter foot', 'deka', 'decimal', 'degree', 'Fahrenheit', 'galen', 'hectare', 'hertz', 'kelvin', 'kilo', 'lumen', 'mega', 'megawatt', 'micro', 'nanometer', 'newton', 'ounce', 'pound', 'quarter', 'tonne' etc. If we consider them in the context of Hindi or other Indian languages, then we find that our units of weight, measurement and physical quantity are similar to those of European countries. According to the principles related to the formation of scientific and technical terminology of the 'Commission of Scientific and Technical Terminology', Government of India, the units of weight, measurement and physical quantity like dyne, calorie, ampere etc. should be adopted in their prevalent English forms as far as possible. Therefore, if there are units of measurement and physical quantity in the scientific-technical material, then it is appropriate for the translator to transcribe them or they should be quoted as they are in the translated material.

8.4.7 Rationale for Translation/Transcription of Bibliography

'Bibliographics', 'reference material', 'suggested readings' are included at the end of high-level texts and research articles etc. of any area of knowledge, particularly in the literature related to science and technology subjects. Through the reference list, this information is sent to the reader that the help of which books, journals, research papers and magazines has been taken in the preparation of the book or the research article. While this list acts as a reference material for the reader, its importance is also unmistakable from the point of view of providing additional study material because it tells the reader more sources of information related to the subject or topic. This list is prepared in a certain manner i.e. the title of the

referred book, name of the author, name of the journal or publisher, year of publication, page number, etc. are mentioned in it e.g. Lodish, Harvey et.al (ed) 2000 Molecular Cell Biology, New York: WH. Freeman.

While translating science-technology related material, the translator often translates such bibliographies or transliterates it as well. While translating or transliterating such reference material into target language, these may not be included in the original material. The objective is not fulfilled. The reason for this is that suppose a reader of the target language has to break down a work referred to in the translated material or a single reference in the library, then for this the name of the author or editor, etc., should be used in the original language of that source language in place of the target language. One has to search according to the spelling as it was originally published in the same spelling and is available in the library under the same title. From the point of view of usefulness and relevance of reference lists, it is appropriate that these lists are given in the original form only. In fact, it is not appropriate to transcribe or translate the bibliography into the script of the target language.

8.4.8 Problems of Common Hindi Names of Objects-Substances etc.

In the translation of science literature, there are also problems of common names of objects, substances etc. in the target language. In descriptive sciences, it is natural to use common names of many types of objects or substances etc. A branch of science i.e. in the field of Biology, common names of plants and animals like 'Lauki', 'Peepal', 'Sharifa', 'Tidda', 'Tateya' etc. are seen. The problems of different names of this type also arise in front of the scientific-technical translator during the translation work. This problem becomes acute when the name of an object, substance or organism etc. which does not exist in the target language or does not have a popular name is used in other material. This problem underlines the fact that the list of standard names of common names of plants, animals, trees, metals, etc. are to be prepared. However, while preparing a standard list of common names related to these, proper attention is to be paid in the context of the omnipresence of names, the availability of different names in different regions for the same object, and the availability of appropriate target language names, socio-cultural contexts etc. But in case of non-availability of equivalent, it is appropriate to give priority to transliteration instead of getting entangled in translation.

8.4.9 Scarcity of Reference Literature

Due to the importance of the subject matter in science and technology, it is essential for the translator to have a good knowledge of the source language and the target language as well as subject-specific knowledge. There are some branches of science like computer science (which includes physics and mathematics subjects), which include many subjects. Similarly, in subject areas like 'oceanography' and 'zoogeography', there is a fusion of social science and science subjects. These include a branch of science i.e. zoology as well as physics and geography. While translating the related material, the translator is expected to have basic knowledge of these also. But at the level of a translator, it is impossible to expect that s/he is proficient in all such related subjects. In such a situation, for a clear understanding of science and technology literature, the translator has to depend on the reference literature so that information about the related subject can be obtained and on the basis of the knowledge of the subject, the meaning of the original can be conveyed in the translation.

8.4.10 Issues pertaining to Time and Space

Every language is linked to the culture of its speakers. Therefore, the reflection of culture in language is natural. Literature is considered to be the mirror of the society in which the marking of social, cultural, political and religious activities of the society is found. In creative literature, this type of time, space and environment creation is its essential element. In every

genre of creative literature, where society and country can be clearly delineated in the depiction of the times and space, in the writing of science and technology also the cultural and geographical background is found taking shelter. There can be many books-articles related to science in which place-specific is included as a reference and that particular place is related to the country where that book or article is written. For example, to describe the height of an object by a Western writer, it can be compared to the 'Alps' mountain. Apart from this, to make the subject interesting and simple, folk-stories, geography, mythological stories, poetry, history, religious tradition and customs are also found in science-technical literature. For example, a synonym for the idiom 'Herculean task' would be communicate the meaning 'a great effort'.

Sometimes the situation also becomes such that the word of the same language becomes different when there is a difference of a particular country. For example, a word 'Physician' is often seen being used in the field of science in English-speaking countries. A UNESCO's publication suggests that the word 'physician', in French, denotes a scientist who deals with the science called 'Physics' in English. Here the word 'Physician' in English means one who practices that art or science, which two centuries ago was called 'Physic' and now has the name 'Medicine'. (Scientific and Technical Translating, UNESCO, p. 214) Although it is not the author's intention to include this type of background related to time and space in literature and science-technical writing, but his aim is to make the basic subject more clear. For example, see the following sentence in English

"Some drugs such as 'Alice-in-wonderland' drug or LSD can help to give access to the secret places of the mind."

'Alice in wonderland' used in the above sentence is basically related to socio-cultural contexts. In the presentation of the subject matter of socio-cultural contexts, this type of presentation raises the problem for the translator as to how to make an equivalent replacement in the target translation of the meaning expressed in the original through it. If the cultural expression 'Alice in wonderland' is translated into words then the readers of the target language, the target reader-class will not be able to understand the meaning contained in the target language. In such a situation, if the translator uses the word which convey the meaning 'wonderful' taking refuge in the translation of the cultural expression then it makes some sense.

The reality is that each interpretation is constrained by cultural geographical contexts, such as time and space. This same cultural geographical background creates difficulty in any kind of translation, including science and technology literature, because if the environment of the time and space in a discussion is different from the time and space of the target language-speaking reader group, then it is not useful for them. In order to provide an equivalent expression to the intention of comparing the height of an object with the 'Alps' mountain by a western writer, the subject matter can be rendered better by preferring the comparison with the 'Himalayan' mountain in front of the Indian reader.

However, in the situation of socio-cultural equality, the work of the translator is somewhat easier. But in the event of socio-cultural differences, it is natural for some aspects to be left out during translation. In case of non-availability of equivalent, the option of translating the socio-cultural context remains only.

At the same time, it may also happen that the translator takes support of socio-cultural contexts even for simple words in accurate subject-rendering. In fact, the pressure of the translator's readership and communication becomes that s/he should present the environment of the time and space in other material by putting it in the relevant environment. However,

this does not allow the literal intent of the original author to be translated, and the translated text incorporates elements of the host language. But at the core of providing a compatible environment, the insistence remains that the text should be presented in a comprehensible manner, the basic meaning should be clear.

The purpose of translation of science-technology literature is to keep knowledge updated and to enrich the languages of developing countries in the field of this type of literature. This goal cannot be achieved unless it is made available within the context relevant to the target language. It is from the information within its environment that a translation can be adapted to the target language readers. In fact, at the time of transfer of science-technical literature from one language to another, simple-clear and natural expression of the original subject can be done only by the relevant environment.

8.5 Let Us Sum Up

In order to realize the rapid development taking place in the field of science and technology in the world, to keep it alive and to prosper in the science-technology literature of their language, other countries have to make their overall development by taking the help of translation. In this lies the relevance of translation of science-technology literature. This translation work can be completed by adopting a certain process. The presentation of scientific and technological subject matter in simple, lucid language and in definite sense and the absence of literary functionalism makes its translation simple in principle. Whereas dimensions such as limited and specific vocabulary in terms of subject-matter meaning create particular types of difficulties in translation of science and technology literature.

Based on the various challenges and problems discussed in the unit, it can be said that translation of scientific and technical works is not an easy task. The translation of this literature is subject-oriented or thought-oriented. In the world of science, more importance is given to the authenticity of the subject, reducing the difference between original and translated science literature. Therefore, the publication of excellent translation is expected. Hence, presentation of scientific technology ideas in a simple language will achieve the objective of promoting scientific achievements and development in real sense and reaching common people. Many challenges in the way of translation of scientific and technical literature, problems arise not only for the translator, but also in the course of authentic original writing work, but the author is not aware of them and faces them. The translator should not be discouraged in any way while facing these challenges and problems, s/he should face them firmly.

8.6 Exercises

1. Explain the need and importance of translation of science and technology literature.
2. How does translation help in enriching science and technology literary tradition?
3. While translating science and technology literature, what should be considered as the 'unit of translation' and why?
4. Through what stages does the translation process of science and technology material go?
5. Consider the problems of translating science-technology literature.

8.7 Suggested Readings

- *Vikassheel deshon mein Anuvad Ki Samasyaen* (Problems of Translation in Developing Countries), New Delhi, 1967.
- *Anuvad: Siddhant Aur Prayog* (Translation : Theory and Application), G. Gopinathan, Lokbharti Prakashan, Prayagraj (Allahabad), 1985.
- *Anuvad Ki Samajik Bhoomika* (The Social Role of Translation), Rita Rani Paliwal, Sachin Publications, New Delhi, 1991.
- *Vaigyanik Sahitya Ke Anuvad Ki Samasyaen* (Problems of translation of scientific literature), Dr. Bhol Nath Tiwari (Ed.) Shabdkar, Delhi, 1986.

