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Expert group meeting on the selection of  
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QUESTIONS OF NOMENCLATURE IN THE SUGAR INDUSTRY ✓

by

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SUMMARY

Nomenclature in the sugar industry is the language of a sub-culture derived from a number of original sources. The need for a central collecting and defining agency is suggested.

Actual language and cultural differences accentuate difficulties of communication especially where definitions are vague or imprecise.

Five areas with differing interests within the sugar industry itself have been defined having certain specialized nomenclature. agricultural and commercial terminology.

Progress in the adoption of I.S.U. measurement nomenclature is observed.

Certain special problems are recognised in developing countries with national language aspirations.

A. General

Nomenclature is essentially the language of a sub-culture which in this particular case is the Sugar Industry. Like languages in any group of society the process of development of the language has taken place over a long period of time and changes can be recognised through the natural processes of evolution.

Unlike an ethnic group living in close physical proximity the community concerned with the sugar industry is scattered through many countries of the world, speaks numerous languages in daily living, and is highly dependent on extended forms of communication. On the other hand the community is composed of people from all strata of society requiring the full range of educational development and practically every trade, profession or type of skill is employed in one way or another.

The language of the sugar industry is not artificial but has grown in a very natural manner. Many of the terms have been initiated at the level of the operator who has found it necessary to describe some particular observation. In this way the terms have originated with rather ill-defined meaning. As the communication of the term has developed and usage extended it has become necessary to reach agreement on a specified definition. Some of these definitions have been fairly easily achieved, others have been very resistant to precise specification. Ethnic language differences and difficulties of communication have compounded problems in achieving definitions.

Whilst present day techniques of achieving agreement of definition have been of great assistance in this direction there has been a simultaneous proliferation of terminology which illustrates the open-ended character of the problem.

What do we need? - A dictionary of acceptable definitions and a grammar to systematise and illustrate the correct usage of agreed terminology.

How is this best achieved? - A central agency for the collection and processing of this information at an international level.

There are various existing agencies at national and international level which undertake tasks of this character and progress can be recognised from a retrospective view of the history of the industry.

The International Committee on Uniform Methods of Sugar Analysis (ICUMSA) performs an important function in the restricted area of analytical terminology and techniques, in spite of problems neither uncommon nor unexpected in a body of this character.

The International Societies of Sugar Cane and Sugar Beet Technologists incidentally give useful, if not always, systematic guidance in the general field of nomenclature.

National societies of technologists or industrially established bodies have done much to provide specified definitions with respect to the more important terminology but the influence of local orientation in usage can usually be recognised. These definitions generally take the form of a glossary of terms in a laboratory manual for analytical control which by its very nature tends to restrict its distribution even within the local industry itself.

Private enterprise through the activities of publishing houses and the concern of individual technical writers has provided some useful additions to this pool of information.

#### B. Interim Conclusion

Coordinated, systematic collection of information related to nomenclature, by a centrally located international body with appropriate terms of reference is needed as a fundamental service to the sugar industry as a well recognised international group.

### C. Language

Whilst the sugar industry has developed its own terminology related to its various areas of concern there is also the important factor to recognise that this development has taken place within many different language groups. Can any useful rationalisation be achieved in this area?

The present expert group meeting is being conducted through the medium of the English language. It is necessary to start somewhere and this was a useful pragmatic decision with more advantages than disadvantages.

The I.S.S.C.T. recognises Spanish as the second language currently of importance in the field of sugar cane technology. After fifty years of life the Society provided simultaneous translations in both Spanish and French at the XVth Congress (Durban 1974).

The sugar beet industry raises different language problems as much of its area of activities lies within countries having a long technological history and more commonly classified as "developed". English, French, German and Russian are all of importance.

In the history of the sugar industry the Dutch language has been prominent and the derivation of much of the nomenclature can be recognised as originating in this language. The Scandinavian and Eastern European language groups cannot be overlooked for their contribution to the literature of the sugar industry and one cannot aspire to being the complete sugar technologist without having read at least some of the relevant writings in Italian.

Approximately one quarter of the people of the world employ the Chinese language for their day-to-day affairs. China is currently not recognised as a member of any international sugar fraternity. The people of China do consume sugar, they also produce sugar - both from cane and beet sources. The time must come when the sugar processing fraternity of that country joins the communication system of the international sugar fraternity. With the latinization of the Chinese language its own importance in the international communication system will progressively increase.



The national languages of developing countries present another set of language problems which will be considered in more detail in a later section.

D. Nomenclature Usage

The nomenclature of sugar technology inevitably overlaps with that of related technologies and in turn accepts nomenclature applying more comprehensively. Five main areas of application may however be recognised within the concept of nomenclature for the sugar processing industry viz:-

1. Analytical nomenclature
2. Processing
3. Equipment
4. Agricultural
5. Commercial

Within each of these fields limited glossaries of terminology have been prepared from time to time. In order to be reasonably comprehensive terms are usually included which could be questioned on the grounds of semantic suitability. In any living language such terminology develops with little reference to semantic acceptability. On the other hand the correct usage of terms does require the development of careful definitions, sometimes restricted in character, at other times of broad recognition.

The very word "Sugar" will need better definition or perhaps it would be better to say more careful usage, as the commercial importance of glucose and fructose develops. The time is coming when the use of the term "Sucrose" may well become essential in commercial terminology.

Already the laxity of technologists within the industry in reference to the so-called invert or reducing sugars is brought into question from time to time. And yet these two terms do have their place even if we do really wish to refer to the hexose group of sugars commonly associated with sucrose at all stages of processing as well as in the agricultural sector. The term "invert sugar" can of course be questioned. It is convenient, its connotation is understood by sugar technologists but we do really refer to the hydrolysis products of sucrose - a cumbersome phrase even if specific.

It is often convenient to differentiate between hexoses resulting from the hydrolysis of sucrose in factory or field and the hexoses naturally occurring in the primary juices of the plants. Or perhaps just to amalgamate them all under the term "reducing sugars" with reference to the analytical techniques commonly employed for the measurement of their concentration. We know that reductionometric analytical techniques are not necessarily specific for hexoses, but they give a useful approximation relatively easily and quickly.

A more reasonably precise technique for specific identification such as one of the variants of chromatography can be used, but is of little value for normal routine purposes. The equipment is expensive, a high degree of manipulative skill is required, the environmental conditions need close control and the relatively long time required to obtain the result all militate against its acceptance except for specialised research information.

This leaves us still in a rather indecisive position from the point of view of nomenclature, but as long as we know the limitations of our terminology and have used reasonable definitions we can go on using the imprecise terms of invert or reducing sugars and those skilled in the art of sugar processing will know well what is meant even if they may generate a measure confusion in the minds of laymen or even of scientists or those skilled in other technologies.

The very word "sucrose" whilst having a good scientifically based definition in chemistry and we know precisely what it is that we are talking about, no one in practice ever really measures this as a specific entity. It has only recently become possible to define an analytical technique in which we can have reasonable confidence of obtaining a precise result confidently in terms of sucrose and sucrose alone. The chemical techniques involving physical and/or chemical properties are well known to have their limitations. The difficulties associated even with these are such that it is common practice within the technology of sugar to be satisfied with results known as polarization or pol or if we wish to be a little more specific - "direct polarization", and furthermore at a particular temperature, and so we go on from step to step giving more precise definition to a term that will never be correct but at least will be reproducible on the same sample by any worker who follows the

rules.

It is possible to get a chemically acceptable precise answer by employing a variant of radiochemical activation analysis. The procedure takes about 2 days for a single sample of molasses. A very high degree of technical skill is required. The equipment is expensive and the results represent only the sample tested and molasses samples are notoriously variable in composition when it comes to precision analysis.

Nevertheless the author is in favour of including such a procedure within the control complex of a sugar processing factory but there are many other aspects of the technology calling for sophistication with more prospect of producing real sugar and requiring more urgent attention.

The analytical aspects of course have their influence in the commercial areas of buying raw materials and selling products. What is it that we are buying? What is it that we are selling? Generally the industry has come to accept indefinite chemical specifics in favour of a physical measurement of satisfactory simplicity and reproducibility.

An example from the processing area from the author's own experience may be cited as another type of problem within the ambit of nomenclature. Possibly the oldest term within the vocabulary of sugar processing is that of molasses - older even than the word sugar itself. In ancient times the most important source of sweetening substance was honey. Wild honey was (and still is) usually dark in colour. In both Greek and Latin the word MELI or MEL was used to refer to this substance. In the early years of what might be called "sucrose technology" the word "melasses" came in to common use to refer to the black, murky substance resulting from the extraction of sucrose from natural plant juices. The word became changed to molasses and the significance of the general Graeko/Latin prefix "Mel" to mean dark coloured has been lost.

The author at one time wished to coin the compound word "melassegenesis" to describe the process of molasses formation. The reversion to the prefix "mel" received immediate acceptance and has since come in to common usage within the art of sugar processing. At the time the spelling was questioned on semantic grounds as to whether it should be melassegenesis or melassigenesis.

The author preferred the former and the referee the latter. The author was allowed to retain his preference in what is believed to be the primary publication using this term. History has not accepted this spelling and common usage now is with the connective "i", the basic discussion was overlooked, forgotten or just not known.

We still ask the question "what is molasses?" We still loosely and often indiscriminately use the terms "syrup" or "liquor" to represent a higher purity concentrated solution of sucrose. From which arises questions relating to the meaning of the word "purity". Is it "apparent", "gravity", "refractometric" or "true" purity or some other adjectival purity and if "true" purity then how "true" is "true"?

A recent example of nomenclature problems in the equipment field has arisen in the term "consistency" as a variant of "viscosity". This is an old problem in related technologies. Is the sugar industry to accept the definition difficulties unquestioningly or should some time be taken to resolve this more satisfactorily from the point of view of the sugar processor? History seems to indicate that confusion will precede clarification.

#### E. Measuring Units

Strictly speaking the selection of measuring units does not fall within the ambit of nomenclature studies as such. But in the absence of a specific section involving a discussion of units of measurement it is considered to rate mention at this stage.

Generally speaking the sugar industry is progressively accepting the adoption of the I.S.U. measurement terminology usually associated with a general change taking place within the country and commonly referred to as "metrication".

Laxity in spelling has resulted in erroneous information being published. In the author's experience this has been particularly significant in the use of the word "tonne" which has at times become abbreviated to the more common spelling of "ton" which really refers to a different weight unit. To obviate

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this error of which the author has been an unwitting victim preference is expressed for the adoption of the term Megagram (Mg) for which there should be no confusion within the content of mass terminology.

Another area in which confusion is consistently introduced is in the use of concentration units. Whether we speak of kilograms per megalitre, grams per kilolitre, milligrams per litre or nanograms per millilitre we always mean the same concentration units of parts per million. However when selling a very sensitive item of chemical measuring equipment it sounds so much more impressive to specify sensitivity in terms of nanograms per millilitre than in kilograms per megalitre. How much more sensible it would be simply to use the term micro parts, or milliparts for parts per thousand as "per cent" or centi parts are parts per hundred.

Statistical studies involving historical information will always require a knowledge of conversion factors from the numerous nationally used units of measurement related to the culture of the country. In this respect the developing countries are still experiencing problems as they strive to apply I.S.U. measurement criteria. This is probably of more particular significance in area measurement for cultivation purposes to which level education more slowly permeates.

#### F. Special Problems of Developing Countries

Reference has already been made to problems arising in developing countries in relation to units of measurement basically ingrained into the culture of the community. The processes of change and education will vary in rate according to local circumstances.


Possibly a more insidious special problem of developing countries with respect to terminology and nomenclature lies within the national language aspirations of that country. It is with understanding that the aspirations of a country are recognised with respect to their own language, and no-one recognises better than those concerned within those countries of the inadequacies of their language to cope with twentieth century technology.

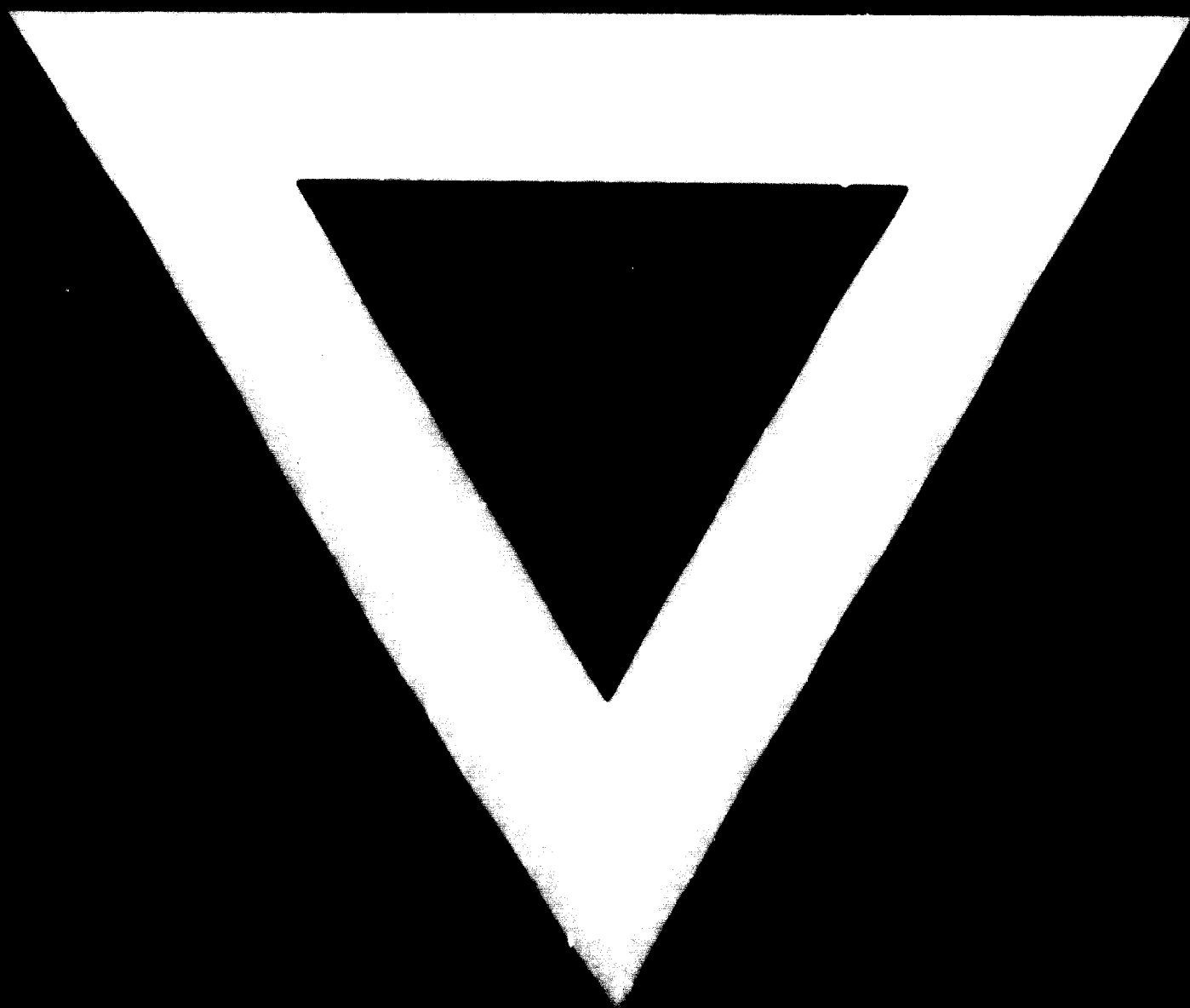
In some cases a form of transliteration has been adopted, in other cases an entirely new term has been coined within the language structure which endeavours to provide a more fundamentally oriented word or phrase. Where local terminology can be developed this may be adopted. The real difficulty, however, lies in specific definition. Languages new to technology are commonly inadequate for specific definition. In art or literature broadly based forms of expression have developed naturally and are adequate for many purposes, but in technology it is necessary to get something more specific than a generalised picture into the mind of the beholder. The inadequacies of languages without articles (definite and/or indefinite) with non-European forms of grammar all militate against real technological development.

Within the author's own experience in this area it was for a long time difficult to recognise that in another language the words for fibre and bagasse were synonymous, whilst molasses and massecurites could be equally confusing. A whole sentence or more might be required to define such differences.

Languages with ideographic characters have additional problems of a special nature. There are many advantages in the use of ideograms but in the context of twentieth century technology they reveal deficiencies when it comes to precise meanings.

#### Questions:

1. What are some of the basic problems of nomenclature experienced in the international fraternity of the sugar community?
  2. How best may we go about reaching agreement on a suitable system of nomenclature?
  3. What language is most suited for basic reference purposes?
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