THE PHYSICAL PROPERTIES OF HOMOEOPATHIC POTENCIES IN RELATION TO THEIR USE

by

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requirements for the Master's Degree in Technology:
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I, Christiaan Johannes van Schalkwyk, do hereby declare that this dissertation represents my own work both in concept and execution.

14-09-1998

Signature of Student

Date of Signature

APPROVED FOR FINAL SUBMISSION

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* Jesus Christ, my Lord and Saviour, Who makes everything possible,

A Deep and Sincere "THANK YOU".

ABSTRACT

In this dissertation the physical properties of potencies in relation to their use is discussed.

The investigation was divided into three: 1) Determination of the physical properties (surface tension and electro-conductivity) of the potencies, 2) Determination of which potencies are used most often (by means of a questionnaire), and 3) To try to find a collaboration between physical properties and use of potencies.

In looking at the physical properties of potencies, and by comparing them to each other, it was found that the physical properties as examined differ from one potency to the next and from one potency scale to the next. When plotted graphically most potency scales showed sinusoidal change. The LM and Korsakovian scales proved to be of little help in any discussion as the experimental methods used proved to be to insensitive. This is in line with the findings of Majerus (1991). It was found that neither the succussion nor the dilution by itself is the sole factor responsible for the effect of potentization, but that it is the consecutive diluting and succussing that effects the change in the physical properties of any one potency.

The finding of the most popular potencies were a much easier task. The CH scale was the most popular, followed by the K, the DH and lastly the LM scales. The most popular potencies are 30 CH (63.9%), 200K (30,6%), 9 CH (25%), 15 CH (23,6%) 200 CH, 6 DH, 1000 K (22,2%) 6 CH, 10 000 K (20,8%). The most frequently used LM potency (LM 2) is only used by approximately 5,6% of practitioners.

Comparing the physical properties of potencies as a way of finding the most active potencies can prove to be a near impossible task given the large number of variables. Few of the commonly used potencies have any physical property in common with each other. All the data received were tabulated (Appendices B and C) and the necessary graphs were drawn (Chapter 4). The discussion of the results is to be found in chapter five.

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TABLE OF ABBREVIATIONS

CH	Centesimal Hahnemannian (Scale or potency)
DH	Decimal Hahnemannian (Scale or potency)
K	Korsakovian (Scale or potency)
LM	Fifty-millesimal (Scale or potency)
mm	Millimetre
mS	milliSiemens
MT	Mother Tincture
r	Correlation coefficient
Sx	Standard deviation

DEFINITION OF TERMS

BATCH - A Specific quantity of medicine\solution that has a uniform character and quality within specific limits, and is produced according to a single preparation procedure during the same cycle of manufacture.

CENTESIMAL HAHNEMANNIAN SCALE: This potency scale has a deconcentration of 1:100. Separate phials are used for each step, and 100 hand succussions are applied between each deconcentration. See Section 2.2.1 for more detail.

CORRELATION COEFFICIENT (r) measures the strength of a linear association between two variables (x and y). It is calculated by using the following equation:

$$r=\frac{n\sum xy-\sum x\sum y}{\sqrt{\left[n\sum x^2-\left(\sum x\right)^2\right]\cdot\left[n\sum y^2-\left(\sum y\right)^2\right]}}$$

DECIMAL HAHNEMANNIAN SCALE: This is a potency scale using a deconcentration of 1:10. Separate phials are used for each step, and 100 hand succussions are applied between each deconcentration. See Section 2.2.2 for more detail.

FIFTY-MILLESIMAL SCALE: A potency scale developed by Hahnemann with a deconcentration of one in 50000. A 1:100 liquid potency are prepared, followed by a 1:500 dilution on granules (one drop of potency on 500 granules). See also section 2.2.3.

KORSAKOVIAN SCALE: A potency scale in which the potencies are prepared by a machine. A single phial is used. See section 2.2.4.

MEAN: The average of a group of data obtained by adding the number (n) of values together and dividing it by n.

MOTHER TINCTURE: Homoeopathic mother tinctures are alcoholic solutions of the soluble constituents of Homoeopathic drugs, such as chemicals, vegetables, herbs or animal substances. The preparation of mother tinctures are according to rules as set out in the Homoeopharmacopoeia.

POTENCY: A Homoeopathic preparation of a certain concentration.

POTENCY BANK: A series of Homoeopathic potencies made from a single medicine, eg. the CH potencies of Pulsatilla (i.e. 1CH, 2CH etc.). They are commonly kept together in a box or container, and are used to produce drops, pills, etc.. Usually each potency has its' own pipette or dropper to avoid cross contamination from one potency to another.

POTENCY SCALE: A series of potencies following a certain deconcentration according to a set method.

POTENTIZATION: Also called dynamization, it is "the remarkable transformation of the natural bodies through the mechanical action of trituration and succussion on their tiniest particles (while these particles are diffused in an inert way on liquid substance) developing the latent dynamic powers previously imperceptible and as it were lying hidden asleep in them" (Organon, par 269).

This process, if performed according to the prescribed methods, increases the physical solubility and physiological assimilation of the drug, while also changing its therapeutic activity as a Homoeopathic remedy.

PULSATILLA: A plant, potencies of which are often used in Homoeopathy. Also called Pulsatilla pratensis, Anemone pratensis or windflower.

RANGE: The statistical value calculated by determining the difference between the largest and the smallest values in a set of data.

STANDARD DEVIATION (Sx): The standard deviation of x_1, x_2, etc, is given by the positive square root of the variance. The equation is as follows:

$$Sx = \sqrt{\frac{\sum x^2 - \frac{1}{n}(\sum x)^2}{n-1}}$$

SUCCUSSION: The process by which energy is imparted to a solution making it a potency. This is generally done by thumping the bottle containing the solution 100 times against a resilient object, eg palm of hand or leather bound book.

Chapter 1

1. INTRODUCTION

It is believed that the nature of the homoeopathic medicines is responsible for their curative actions, but as the dilution of the potencies quite often exceeds the limit where it is probable that there is none of the original substance left (Frazer, P.A., Lecture notes, 1993), their actions must be due to other reasons than the presence of the basic substance.

It is thus important to look at the physical properties of potencies in order to explain their action, and this might be very important to determine which of the many potencies available, to choose.

Some work has been done on the physical properties of potencies, for example Kumar and Jussal (1979), who measured the surface tension of potencies. They found changes in the surface tension from one potency to the next. Other experiments focusing on various physical aspects, such as ultrasonic absorption (Silvio and Arnaldo, 1990) have been carried out. All these experiments show there must be some difference in either the potency's chemical and/or physical nature as it can be shown mathematically that none of the original substance is left in the higher potencies. This would suggest that the physical make-up of the potencies is probably more important than the chemical composition.

If the vehicle (alcohol/water mixture) used for preparing the potencies is kept constant, the variation in the physical properties of the potencies should give an idea of their action and strength of action. In none of the literature sources reviewed the different potency scales were compared with one another.

Therefore the purpose of this investigation is to determine the interrelationship of different Homoeopathic potencies prepared from the same source (Pulsatilla) by the same and different modes of preparation (CH, DH, LM, K) to try and find the most active potency by looking at a) the surface tension and b) the electrical conductivity of each potency in relation to potencies commonly used in clinical practice in order to determine which potencies might be clinically most active.

1.1. OBJECTIVES

The objectives of this study are the following:

- Measuring the surface tension of the various Homoeopathic potencies in order to determine their interrelationship with each other and the possible most active potencies,
- Measuring the electrical conductivity of the various Homoeopathic potencies in order to determine their interrelationship with each other and the possible most active potencies,
- Collection of data to determine which potencies are most commonly used by Homoeopaths in practice in order to establish which potencies are most widely used,
- Correlation and comparison of data gained in the above mentioned objectives in order to try and explain the interrelationship of the various potencies and potency scales, and

also to see which potencies might be clinically most effective.

1.2. SIGNIFICANCE AND IMPLICATIONS OF THE STUDY

The study will show the relationships potencies and potency scales have with each other. The study will also show the effects and importance of dilution and succussion in preparing homoeopathic potencies, although this is not part of the objective of this study. Some ideas are given in this study as to why homoeopathic potencies are still active even after their deconcentration has passed Avagadro's number.

Chapter 2

2. REVIEW OF THE RELATED LITERATURE

2.1. PHYSICAL PROPERTIES OF POTENCIES

It is known that Homoeopathic potencies contain a very low concentration -if any- of the original substance after the 12 CH potency, as it is past Avogadro's number (6,023 x 10^{23}).(Frazer, 1993; Majerus, 1991). This has been proved by the French using a Geiger counter to measure the level of radioactivity in potencies of radioactive potassium bromide. They found no measurable levels of radioactivity after the 9 CH potency. (Stephenson, 1973)

This means that any differences in potencies higher than 12 CH must be due to microstructural change.

Water, alcohol and lactose, the three most common vehicles used in Homoeopathy, all show marked bipolarity, i.e. they have positive and negative ends. Due to this peculiarity Kumar and Jussal (1979) hypothesized that the effect of the potencies can be attributed to the transportation of a micro-configuration between the different molecules of the vehicle. This was brought about by changing the relation of the different molecules with each other, eg. changes in bond angles (Similar to the "memory effect of water" theory (Popp, 1990)). These changed and "charged" molecules then could affect an organism by affecting cell membranes, which are also positively and negatively charged, (eg. nerve cells). (Kumar and Jussal, 1979) This obviously mean that there must be a measurable physical difference between one potency and a next.

In the next few paragraphs a more in-depth look into the physical (measurable) differences of potencies are given.

2.1.1. SURFACE TENSION

Surface tension is a property of liquids that depends on the forces between the molecules of the liquid. A change in the molecular composition, temperature or electrical charge of a liquid may bring about a change in its surface tension. (Wilson et al, 1968:82-85,88-90) Kumar and Jussal (1979) tested their hypothesis that potencies are bipolar in nature by measuring the surface tension by means of the capillary rise method. They used CH potencies of Nat mur, from the 6th to the 30th, and found a great variation in the surface tension of the various potencies. The results of their research are summarized in the following graph:

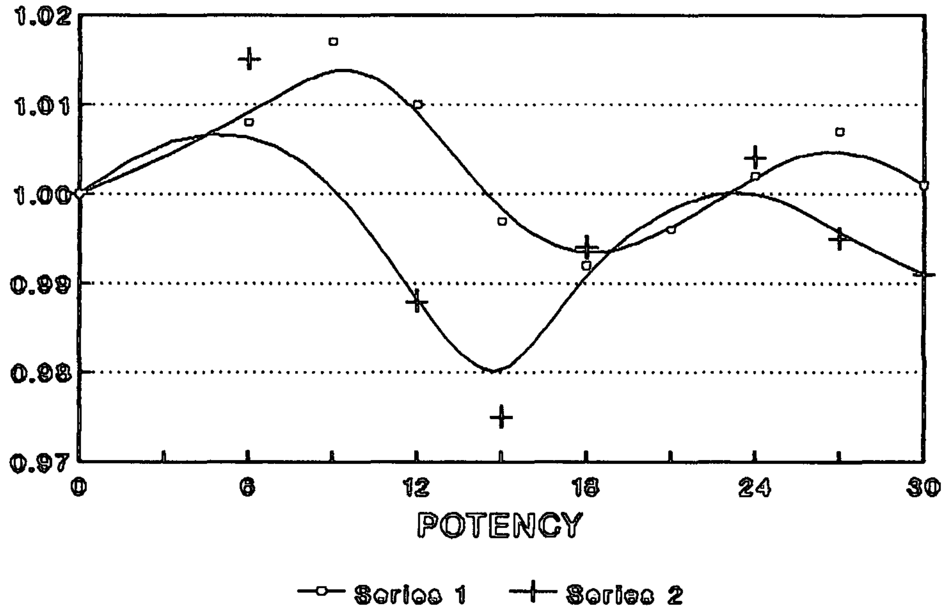

Fig. 2.1 Variation of surface tension in relation to potency for a set of Nat mur potencies (After Kumar and Jussal, 1979).

Variation in results were explained by differences in preparation. Exposure to air, heat and light also seemed to have a neutralizing effect on the potencies (Kumar and Jussal, 1979).

These results are also applicable to Pulsatilla, although it is not bipolar as is the case with Sodium chloride. In this dissertation the rise of a liquid in a capillary tube is to be used as an indication of surface tension. The capillary must be held exactly vertical, should be of uniform radius, free from deviation in circularity in cross section, with a small enough bore to allow the liquid to rise measurably. If the temperature is kept fairly stable, the capillary rise method is one of the most accurate methods measuring surface tension. (Adamson, 1976:9-16)

2.1.2. ELECTRICAL CONDUCTIVITY

Electrical conductivity is a measurement of the ability of a substance, in this case potencies, to allow electricity to flow through them, and is measured in milliSiemens (mS). These measurements gives an indication of the physical properties of the measured liquid.

The electrical conductivity of a liquid is measured by means of a conductimeter, the full details of which are given in the section regarding the relevant experimental design (Section 3.4.2).

2.1.3. OTHER

Other experiments done on potencies' physical properties include:

- Different patterns of refraction of X-rays were observed when they were passed through potencies (Kumar and Jussal, 1979).
- Silvio and Arnaldo (1990) performed ultrasonic velocity and absorption studies on Homoeopathic and placebo solutions in

order to investigate the possibility of microstructural differences between the two. They found no conclusive evidence of any such differences, but did not exclude the possibility that ultrasound cannot, due to its nature, provide very detailed information about the physical differences between the two liquid systems studied.

* Heintz (Quoted by Gibson, 1968)) showed that the infrared absorption spectra of eg. sodium nitrate, acetic acid, etc. showed peaks of absorption at the D6, D9, D12, D14, D18, D21, D23 and D26 potencies.

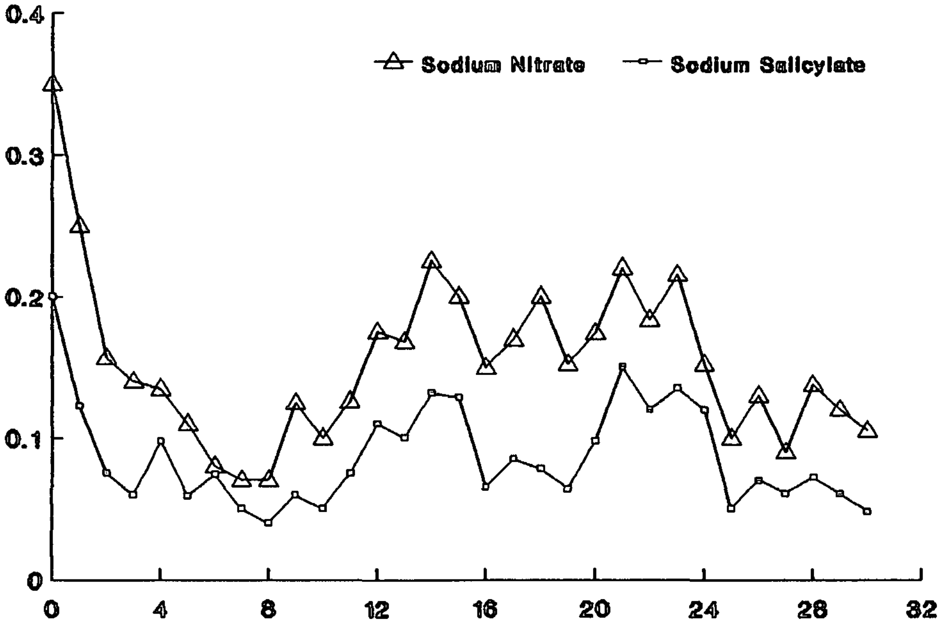

Fig 2.2 Infrared absorption at 7.2 microns of Sodium nitrate and Sodium salicylate (after Heintz)

2.2. POTENCIES IN HOMOEOPATHY

Hahnemann's primary motivation for producing a method of potentization was to decrease the toxicity and side effects of the medicinal substance without losing its curative ability. He was able to do so by diluting and succussing substances. He formulated two main methods of potentization, as it is called, the Centesimal (CH) scale and the LM scale. (Hahnemann, 1921) Two other commonly used potency scales are the Decimal (DH) and Korsakovian (K) scales.

Many other different methods of preparation of medicines reported to be Homoeopathic due to their extreme dilution have been formulated. All of these cannot be seen as real Homoeopathic medicines, not because they are not diluted (although this may also happen, eg. Jenichen who produced very high "potencies" by extreme succussion but with no dilution), but because of their lack of succussion. Some of these include "potencies" prepared by succussion after every fifth or tenth dilution, application of kinetic energy by ultrasound, or shooting a jet of liquid into a vat. (Frazer, 1993; Stephenson, 1973)

Four potency scales (CH, DH, LM and K) were chosen for this study due to their wide use and acceptance.

2.2.1. THE CENTESIMAL HAHNEMANNIAN SCALE

The exact number of phials or small bottles required (one for each potency) are taken, labelled and numbered. Thus to prepare thirty potencies thirty bottles are needed.

The bottles are placed in numerical order and 99 parts (drops) of a water-alcohol mixture (diluted alcohol) are placed in each bottle. One part (drop) of mother tincture is placed in the first bottle. The bottle is successed (100 times) and placed down to rest for three minutes. This is the 1CH potency. To make the subsequent potencies the above process is repeated: one part of the previous potency is placed into the next bottle containing 99 parts of diluted alcohol. This is then successed, and produces the next potency. This process is repeated until the desired potency (30 CH) is reached.

This process leads to a deconcentration of one in a hundred. The first potency's concentration is thus 1/100 or 10^{-2}, the second's 10^{-4}, etc. This results the concentration of the 30th potency to be 10^{-60}. (Hahnemann, 1991; Frazer, 1993; Majerus, 1991)

This was the first method Hahnemann used for producing potencies. Later on he formulated and used the LM scale.

2.2.2. THE DECIMAL HAHNEMANNIAN SCALE

The preparation of the DH scale of potencies was proposed by Dr. C. Hering (Frazer, 1993) and is very similar to that of the CH scale, the only difference is that one part potency is added to 9 parts diluted alcohol in order to give rise to the next potency. It is then necessary to use sixty bottles to reach the 60th potency.

The deconcentration of the first potency is thus 1/10 (10^{-1}), the second 10^{-2}, and the 60th 10^{-60}. Potencies are marked D, DH or X, denoting this method of preparation. (Stephenson, 1973; Frazer, 1993)

2.2.3. THE 50-MILLESIMAL SCALE

By the time Hahnemann wrote the 6th edition of the Organon he had developed a more effective way of preparing potencies. This is the Quinquagenimilesimal (50-millesimal) or LM potency scale.

The preparation is as follows:

The first three potencies are prepared according the method for preparing the CH potencies as set out above. One drop of the 3CH liquid potency is put into 500 drops (10 ml) of 20% alcohol (2 ml 70% alcohol + 8 ml distilled water). Mix (not succuss) for five minutes. This is the LM Mother Tincture.

One drop of the LM Mother Tincture is added to 99 drops of 70%

alcohol and successed 100 times. This is the LM1 or 0/1 liquid potency. One drop of the LM1 liquid potency is placed onto 500 granules of equal size. Rotate the granules, ensuring equal absorption and saturation of the granules. Let dry. This is the LM1 granules.

One dry granule of the LM1 potency is placed in a new clean phial and one drop of distilled water added. After dissolution, 99 drops of 70% alcohol is added, the phial capped, successed, and labelled LM2. Repeat the steps as above (i.e. from liquid to granule to liquid potency) to reach the 30th LM potency.

The scale of deconcentration for this method is as follows:

3CH	= 1/1000000 ($1/10^6$)	$= 1 \times 10^{-6}$
LM Mother Tincture	$= 10^{-6} \times 1/500$	$= 5 \times 10^{-8}$
0/1 Liquid	$= (5 \times 10^{-8}) \times 1/100$	$= 5 \times 10^{-10}$
0/1 Granules	$= (5 \times 10^{-10}) \times 1/500$	$= 5^2 \times 10^{-12}$
0/2 Liquid	$= (5 \times 10^{-12}) \times 1/100$	$= 5^2 \times 10^{-14}$ etc.

The deconcentration between one liquid potency and the next is thus: $(52 \times 10^{-14}) - (5 \times 10^{-10}) = 5 \times 10^{-4}$ = 1:50'000.

Thus the concentration of the 30th LM liquid potency is $(5 \times 10^{-10}) \times (5 \times 10^{-4})^{29} = 9.3 \times 10^{-146}$, an extremely high dilution indeed. (Hahnemann, 1921; Frazer, 1993)

Majerus (1991) reports that this method of preparing medicines is not as precise as the preparation of CH and DH potencies, and is thus unsuitable for research purposes. This he validates by the fact that the sizes of the granules are not exactly even, even when sieved, also some granules may absorb more liquid than others, or drying could take place in an uneven manner. However, the LM potencies are still included in this research project for the sake of completeness.

2.2.4. THE KORSAKOVIAN SCALE

In 1832 a Russian, General von Korsakoff, devised a preparation method using a single phial. He prepared the potencies by hand but nowadays it is done by machine. A phial is filled with 100 parts of the Mother Tincture. 99 parts of this is sucked out, the phial is filled with 99 parts of diluent (water or alcohol) and a short burst of succussion is applied to it. It is left to rest for 15 seconds, whereafter 99 parts of the potency is sucked out. This process is repeated until the desired potency is reached. Often the last potency is done in 70% alcohol to lengthen shelf life and to ease its use for impregnation. (Frazer, 1993; Majerus, 1991)

This method is a very variable one due to the many factors that might influence its' manufacture, eg.:

- The type of material that the phial is made of, its' size, shape and internal smoothness,
- The phials' ability to absorb or react to the tincture,
- The drugs' solubility, surface tension and tendency to adhere to the phial,
- The amount of succussions applied to the phial, and period of rest in between potencies, and
- The temperature and relative humidity of the air in the laboratory.

This, however, did not prevent Korsakovian potencies being widely used, especially due to their supposed milder action on the human organism. (Frazer, 1993; Majerus, 1991)

Majerus (1991) stated that due to these uncontrollable and variable factors the Korsakovian potencies are not suitable for scientific research. Another problem encountered in the present study was the unavailability of a large variety of Korsakovian potencies commercially, thus giving statistically unacceptable results.

2.2.5. INTERRELATION OF POTENCIES

The different potencies and potency scales can be related to each other in various ways, eg. by looking at their mode of preparation, their deconcentration, or the number of succussions they are subjected to.

CH AND DH POTENCIES have very similar modes of preparation, but the scale of deconcentration differ (CH 1/100; DH 1/10). This means concentration wise a 1CH is equal to a 2 DH, a 2CH to a 4 DH and a 30CH to a 60DH, but that the DH potencies are succussed twice as many times as the corresponding CH potencies. (Frazer, 1993)

BOTH CH AND K POTENCIES have apparent deconcentration of 1/100, but CH potencies are prepared in different phials and K potencies in the same phial. To the average person (and to even the not so average - Hahnemann himself made the same mistake!) there seem to be no significant difference between the two, but a study done by Daudel and Robilliart (commented upon by Nicholson (1961)) with radioactive Potassium bromide showed that after 1000 Korsakovian dilutions there was still a weak but measurable level of radioactivity left. It was demonstrated before that after the 9 - 12th CH potency no more radioactivity could be measured. This would suggest that the mother tincture in one way or the other is not completely removed from the sides of the phial, and traces of it are still left even after 1000 dilutions. Cazin did similar experiments (Frazer, 1993) and found that in relation to the amount of substance, i.e. Mother Tincture, left, a 30K is approximately equal to a 5 CH, a 200 K to a 7 CH and a 1000 K to a 9 CH. It can thus be said that the curve of deconcentration asymptotically approaches the x axis without ever touching it (Majerus, 1991).

Graphically the results of the experiments with radioactive isotopes is as follows:

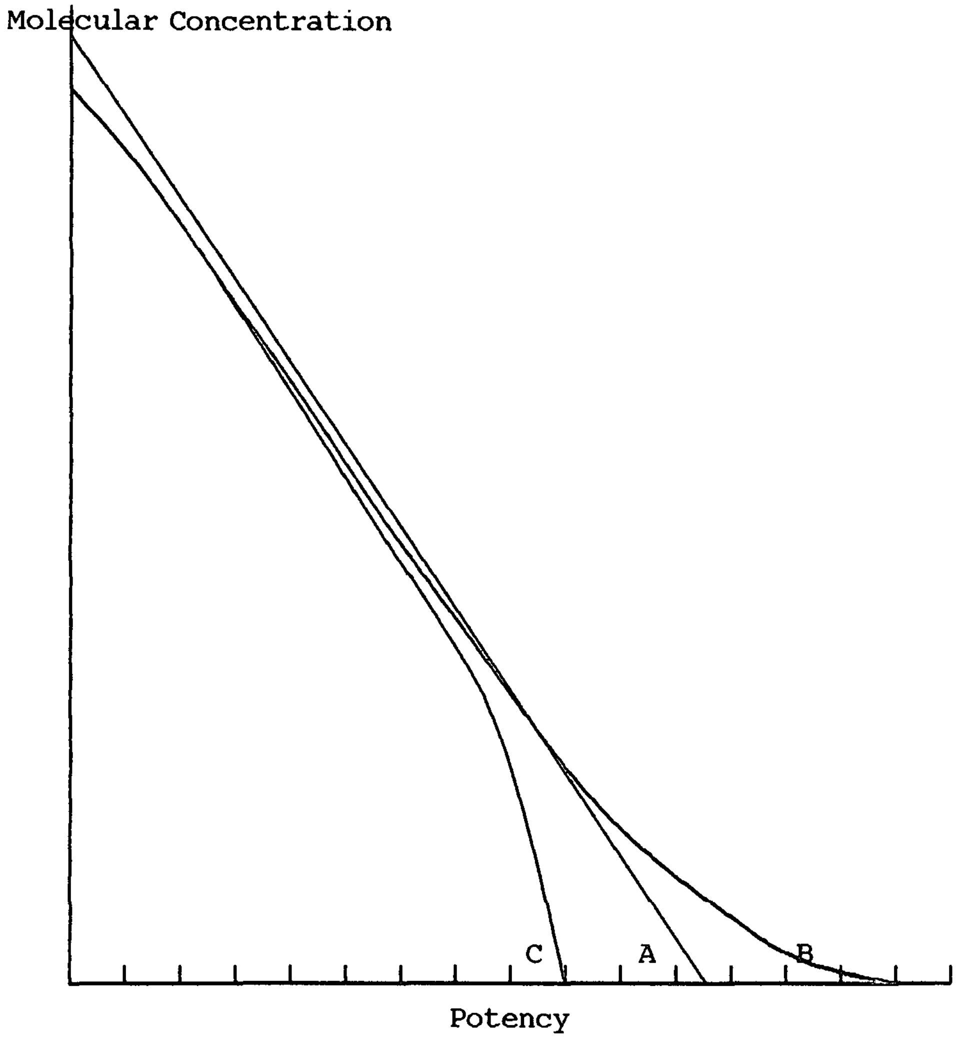

Fig 2.3. Experimental and Theoretical Curves of Progressive Molecular Concentration, Where:
a) is the theoretical curve (projected as a straight line function),
b) is the experimental curve for the CH scale, and
c) is the experimental curve for the Korsakovian scale.

Following are two tables comparing the different potencies in relation to deconcentration and number of succussions.

The Korsakovian scale has been omitted from this table as its exact level of deconcentration cannot be established (Majerus, 1991).

Table 2.1. The relationship of potencies in relation to their respective concentrations:

Concentration	DH	CH	LM	K
10^{-1}	1			
10^{-2}	2	1		
10^{-3}	3			
10^{-4}	4	2		
10^{-5}	5			
10^{-6}	6	3	"MT"	
10^{-7}	7			
10^{-8}	8	4	1	
10^{-9}	9			
10^{-10}	10	5	2	30
10^{-14}	14	7		200
10^{-15}	15		3	
10^{-18}	18	9	4	1000
10^{-20}	20	10	5	
10^{-24}	24	12	6	
10^{-29}	29		7	
10^{-34}	34	17	8	
10^{-38}	38	19	9	
10^{-43}	43		10	
10^{-48}	48	24	11	
10^{-52}	52	26	20	
10^{-57}	57		30	
10^{-99}	99			
10^{-146}	146	73		

DH = Decimal Hahnemannian potencies
CH = Centesimal Hahnemannian potencies
LM = 50-Millesimal potencies
K = Korsakovian potencies

Table 2.2. The relationship of potencies in relation to the number of successions:

Succussions	DH	CH	LM
100	1	1	
200	2	2	
300	3	3	"MT"
400	4	4	1
500	5	5	2
600	6	6	3
700	7	7	4
800	8	8	5
900	9	9	6
1000	10	10	7
2000	20	20	17
3000	30	30	27
3300	33		30
6000	60		

DH = Decimal Hahnemannian potencies
CH = Centesimal Hahnemannian potencies
LM = 50-Millesimal potencies
K = Korsakovian potencies

These tables clearly show a difficulty and difference in opinion in Homoeopathic circles: Which are the higher potency, the 60 DH due to its many succussions or the 30 LM due to its extreme dilution?

2.3. SUMMARY

In the preceding paragraphs various literature resources were reviewed with regards to the way in which potencies are prepared, as well as the various methods used in investigating their physical properties. By using two of these methods, surface tension and electrical conductivity, it is proposed to seek the interrelationship of the various potencies and preparation methods.

Chapter 3

3. MATERIALS AND METHODS

3.1. THE POTENCIES: PREPARATION AND STORAGE

The potencies used in this study were subjected to strict preparation, handling and storage methods in order to ensure maximum comparability with each other by eliminating possible environmental influences. These procedures were:

* The conditions and regulations regarding the manufacture of the different potencies are discussed in detail under the topic of Potencies in Homoeopathy (Section 2.2.) and are not repeated here. The methods as set out in that section for the preparation the potencies were strictly adhered to.
* All the potencies were prepared from the same batch of mother tincture in order to provide an identical starting point for the CH, DH and LM potencies. The Korsakovian potencies were bought from an outside company.
* The CH, DH and LM potencies were all prepared by the same person.
* The alcohol used to prepare all the potencies was from the same batch to ensure that any difference observed could not be contributed to differences in alcohol concentration. Korsakovian potencies were either raised one potency (from liquid potencies) (set one) or prepared from pills (one pill per 100 drops of alcohol) (set two) to ensure that the alcoholic concentration of the potencies were the same.

- Identical size phials were used for preparation of any one potency scale, although different size phials were used for the different scales due to practicality and cost involvement.
- Succussion was as near to identical from one preparation to the next as is humanly possible in order to ensure identical potentization. All succussions were done by hand.
- A potency bank (i.e. potency series) was prepared for all the potency scales. Larger volumes of liquid potency (needed for in the conductivity tests) were prepared in 100 ml bottles from the previous potency.
- All readings were taken with the temperature kept constant, and all potencies were stored under identical conditions to eliminate any changes in them due to environmental factors.
- The same meter was used in taking all the measurements for one experiment (eg. the same vernier calliper were used to take all the readings for the capillary rise experiment, similarly the same conductivity meter was used for all the conductivity measurements).

The following potencies were prepared and used in this study:

CH scale - The first thirty potencies,

DH scale - The first sixty potencies,

LM scale - The first thirty liquid potencies,

K scale - A variety of potencies commercially available were obtained. The number of potencies used later proved to be too small to obtain statistical reliable results. Two sets of potencies were used, the first set were liquid potencies, and the second pills. The pills were dissolved in water before the experiments were done.

3.2. THE SURFACE TENSION OF POTENCIES.

The objective was to determine the surface tension of the different Homoeopathic potencies in order to determine their interrelationship with each other and the possible most active potencies.

The surface tension itself was not measured, but the rise of fluid in a capillary tube, which is an indication of the surface tension, was measured. (Adamson, 1976:15-16)

The following equipment was used:

- Microscope cover slips (20 x 20 mm),
- Vernier calliper,
- Capillary tubes (75 mm long, 10 microliter),
- Homoeopathic potencies (as mentioned previously).

METHOD: Eight to ten drops of the potency were placed on a cover slide. The capillary tube was held vertical and the end of it placed into the liquid. After the liquid stopped rising, the height was marked with a fine pen before the tube was removed from the liquid. The height was marked with the pen before removal as little drops tend to stay behind on the tip of the capillary tube and force themselves into the tube, which caused unreliable results. The distance from the end of the tube to the mark was measured with a vernier calliper (0.05 mm accurate). Every measurement was noted down and tabulated. (The full results are available in Appendix B.)

A new capillary tube was used for every measurement. Five different readings were taken for every potency. The laboratory temperature was kept constant.

The remainder of the liquid on the slides, the slides themselves and the used capillary tubes were discarded.

STATISTICAL ANALYSIS: Five readings (R_1-R_5) were taken for each potency. The mean, range and sample Standard Deviation (Sx) was calculated for every potency. Tables of the full results are reproduced in Appendix B.

The mean were used for further statistical evaluation. Results are displayed in Chapter four (Section 4.2.) in the form of graphs. Correlation coefficients were calculated between the various potency scales, with specific reference to concentration of the base substance and number of succussions applied.

3.3. THE ELECTRICAL CONDUCTIVITY OF POTENCIES

The objective was to determine the electrical conductivity of the different Homoeopathic potencies in order to determine their interrelationship with each other and the possible most active potencies.

The following equipment was used:

- Conductimeter (Model E527, Metro-ohm AG CH 9100) with conduction/measuring cell (Model EA 608-08, Metro-ohm),
- Measuring cylinders,
- Distilled water,
- Homoeopathic potencies (as mentioned before).

METHOD: A batch of 8 Litres of distilled water was set aside for this experiment. All the potencies used in this experiment were made from this one batch of liquid.

50 ml of every potency were prepared in 100 ml bottles. The potencies were prepared from the potencies in the potency banks. They were

rested overnight to allow for temperature stabilization.

The potencies were subdivided equally into five glass cylinders. The measuring cell was submerged into the first cylinder, the conductivity determined and noted, the cell removed and placed into the second cylinder. The rest of the readings were similarly determined. Between the readings of one potency and the next the measuring cell was rinsed in distilled water, but not between the readings of the same potency.

Every measurement were noted down and tabulated. (The full results are available in Appendix C.) All the readings were taken with the laboratory temperature held constant.

After the measurements were noted down, the potencies were discarded.

Accuracy and reliability of the results are ensured by the manufacturers by the use of a transistorized phase sensitive amplifier incorporated into the apparatus. The conductimeter had an accuracy better than ± 2% of the measured value (Metro-ohm users guide).

STATISTICAL ANALYSIS: Five readings (R_1-R_5) were taken for each potency. The first reading was discarded and not included in further calculations. This was done because the drop of distilled water remaining behind in the cell after it has been rinsed in the distilled water affected the conductivity reading of the following potency. The mean, range and sample Standard Deviation (Sx) were calculated for potency from the remaining readings. Tables of the full results are reproduced in Appendix C.

The mean was used for further statistical evaluation. Results are displayed in Chapter four (Section 4.3.) in the form of graphs.

Correlation coefficients were calculated between the various potency scales, with specific reference to concentration of the base substance and number of succussions applied.

3.4. POTENCIES USED IN PRACTICE

The objective was to collect data regarding potencies most commonly used by Homoeopaths in practice in order to establish which potencies are most widely used.
A questionnaire was used.

METHOD: Questionnaires were sent out to all the practitioners belonging to the South African Homoeopathic Association. The addresses were obtained from the then current address list of the said association. The questionnaire was printed on a postcard, stamped and mailed with a letter asking the practitioners assistance (Appendix A). The practitioner only had to mark the relevant potencies he/she commonly used in practice, and return the postcard.

STATISTICAL ANALYSIS: The responses of the practitioners are represented in table form with regards to potency scale and number. The frequency distributions of the use of the potencies (CH, DH, LM, K) are calculated and graphically represented.

3.5. COMPARISON OF POTENCIES AND POTENCY SCALES

The objective was to use the data from the experiments and the questionnaires to interrelate the action of potencies and to determine which potencies might be clinically most active. The statistically treated data so far obtained, was used.

METHOD AND STATISTICAL ANALYSIS: A comparison of the various potency scales is given (eg. between DH and CH), as well as a comparison between the two experimental methods (eg. capillary rise and electrical conductivity). The comparisons are shown graphically, while complete tables with all the information are available in Appendices B and C. Where possible any correlation coefficients (r) have been calculated.

Comparative graphs are found in Section 4.4., and the evaluation and discussion of the results in section 5.4.

3.6. SUMMARY

This chapter deals with the data, and more specifically the ways in which it was obtained (experimentally and by questionnaire) and treated statistically to give rise to the tables (Appendices B and C) and graphs as in Chapter four.

Discussion of these results follows in Chapter Five

Chapter 4

4. THE RESULTS

The following graphs and figures are the graphical representations of the results obtained. The complete, untreated data as obtained experimentally are available in Appendixes B and C. The mean as calculated and shown in the tables was taken as the value for that potency and was used as such for all the other statistical calculations.

4.1. CRITERIA GOVERNING THE ADMISSIBILITY OF DATA

The data collected must be of relevance for use in the dissertation. In the case of the experiments (capillary rise and electro-conductivity) the data must have been generated according to the methods set out in the relevant "METHOD" sections.
Only data collected from questionnaires completed by qualified registered practitioners practicing in South Africa was accepted.

4.2. THE SURFACE TENSION OF POTENCIES.

The following figures and graphs are the graphic representation of the experimental findings for the determination of the capillary rise of potencies as a factor of surface tension. The full results were tabulated and are available in Appendix B.

Except where otherwise noted the y-value is the hight of the liquid in the capillary tube (in mm), and the x-value the specific potency.

Figures 4.1 and 4.2 show the results of the surface tension experiments done on the CH potencies. In Fig. 4.1 the results are displayed as a straight line graph and as a trend. The trend shows a definite upward motion. In Fig. 4.2 a clearly sinusoidal graph can be seen. It is interesting to note that the surface tension of the first few potencies are very close to each other and that the surface tension changes more dramatically from one potency to the next as the concentration of the Pulsatilla tincture decreases.

Figures 4.3 and 4.4 show the results of the surface tension experiments done on the DH potencies. In Fig. 4.3 the results are displayed as a straight line graph and as a trend. Interesting is the fact that about a third of the points are between turning points, eg. DH 2, DH 6, DH 8, DH 12, etc.. The trend show a marked upward motion. In Fig. 4.4 the data is represented as a curve, and a sinusoidal graph can be seen. As can be seen the changes in the surface tension are not uniform between one potency and the next, and several large changes are seen, for example between the 31st and the 33rd potencies.

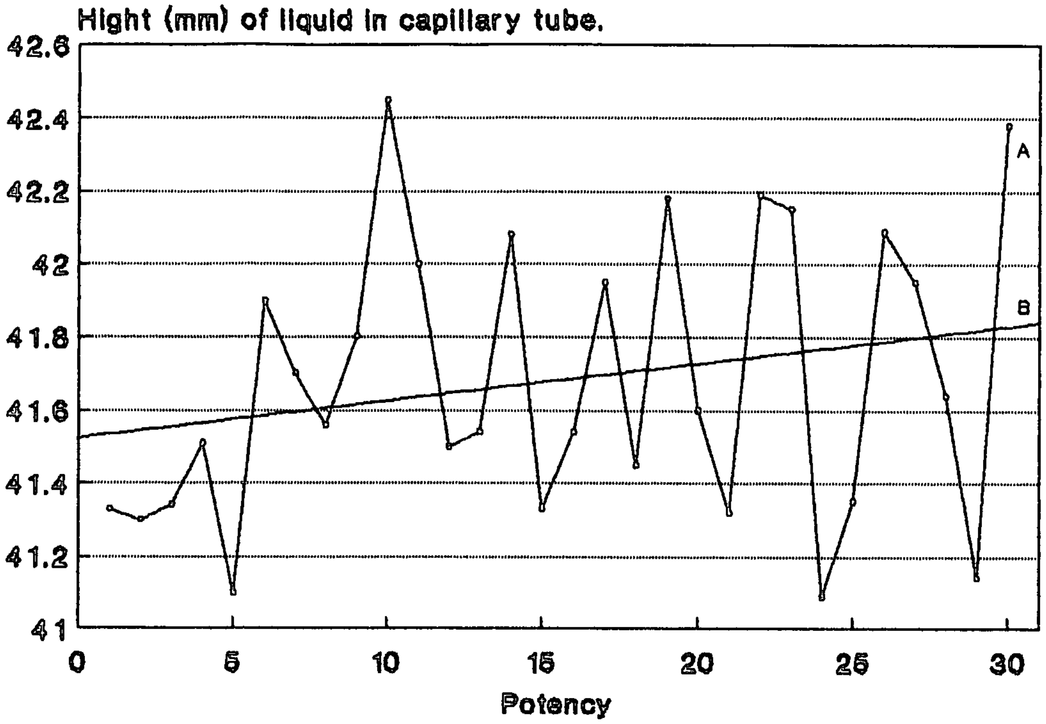

Fig 4.1 The rise (in mm) of CH potencies in a capillary tube
A as a straight line graph and B as a trend

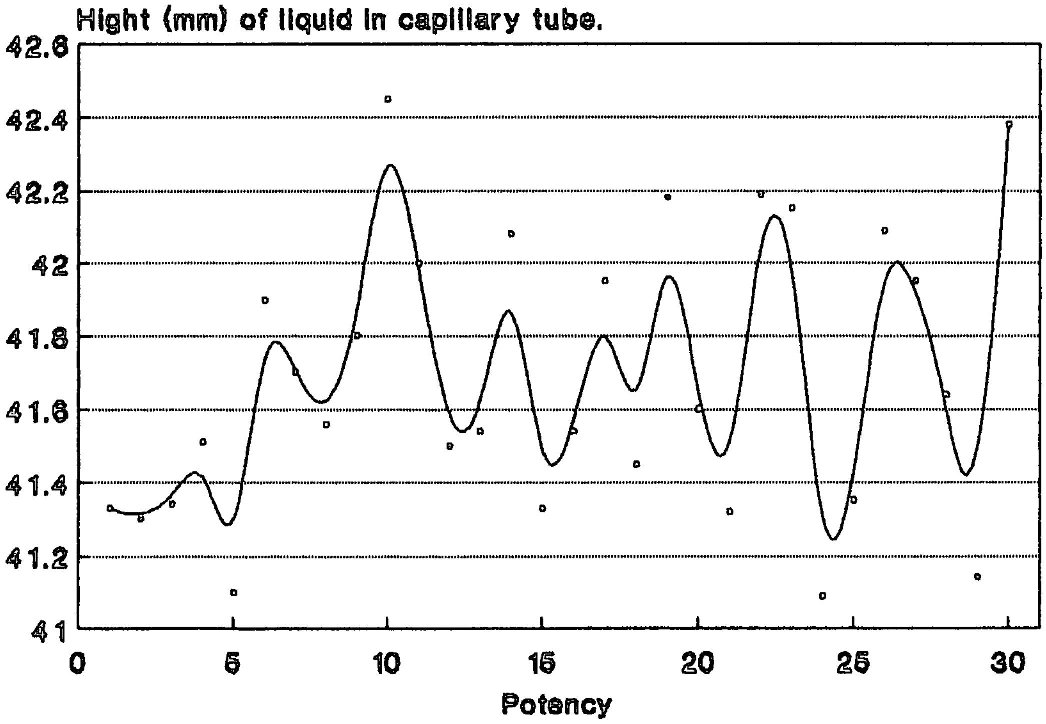

Fig 4.2 The rise (in mm) of CH potencies in a capillary tube as a curve

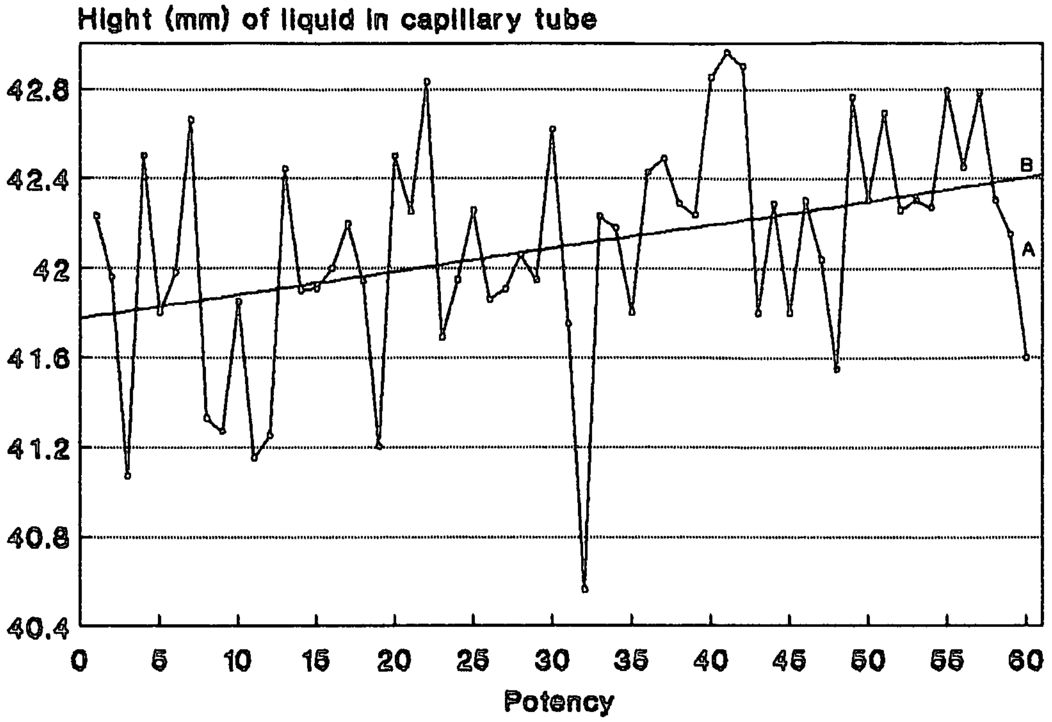

Fig 4.3 The rise (in mm) of DH potencies in a capillary tube
A as a straight line graph and B as a trend

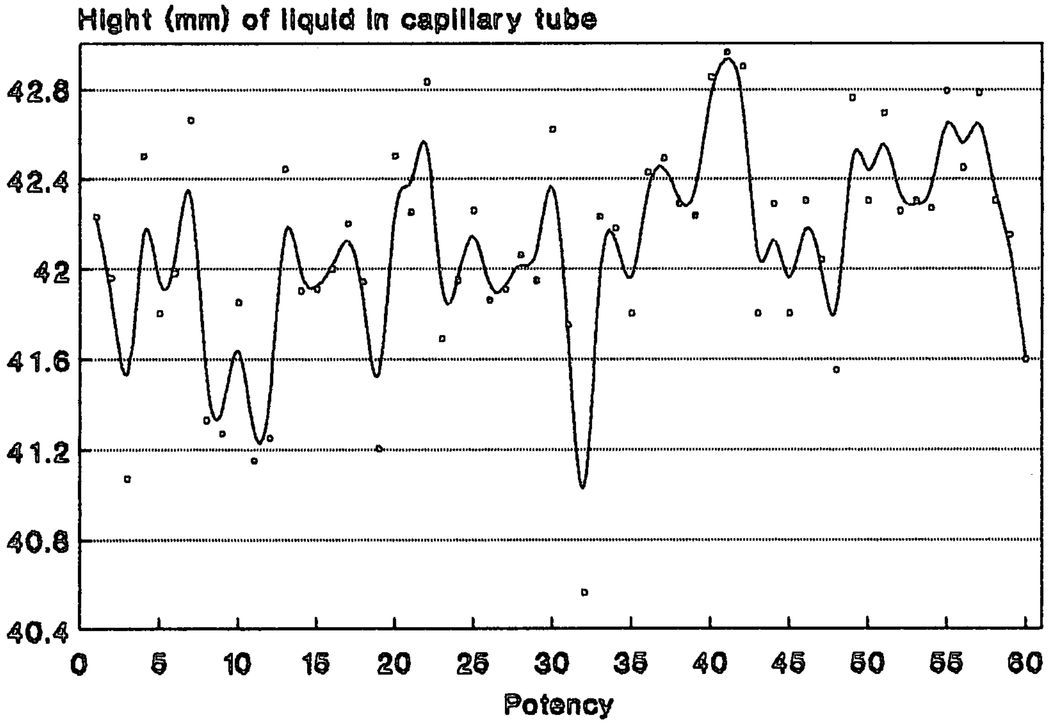

Fig 4.4 The rise (in mm) of DH potencies in a capillary tube as a curve

Figures 4.5 and 4.6 show the results of the surface tension experiments done on the LM potencies. In Fig. 4.5 the results are displayed as a straight line graph and as a trend. The trend shows a small upward motion. In Fig. 4.6 the data is represented as a curve, and a fairly simple sinusoidal graph can be seen, with one marked upward motion at LM 12, and lows at LM 5 and LM 25.

Figures 4.7 to 4.10 show the results of the surface tension experiments done on the K potencies are shown. Figures 4.7 and 4.8 show the results of the first potency series, and figures 4.9 and 4.10 of the second. In figures 4.7 and 4.9 the results are displayed as straight line graphs and as trends. These are the only trends thus far showing a downward motion, and this is probably due to the small amount of potencies used. In Figures 4.8 and 4.10 the data is represented as curves, and although Fig. 4.8 shows some sinusoidal movement, Fig. 4.10 does not.

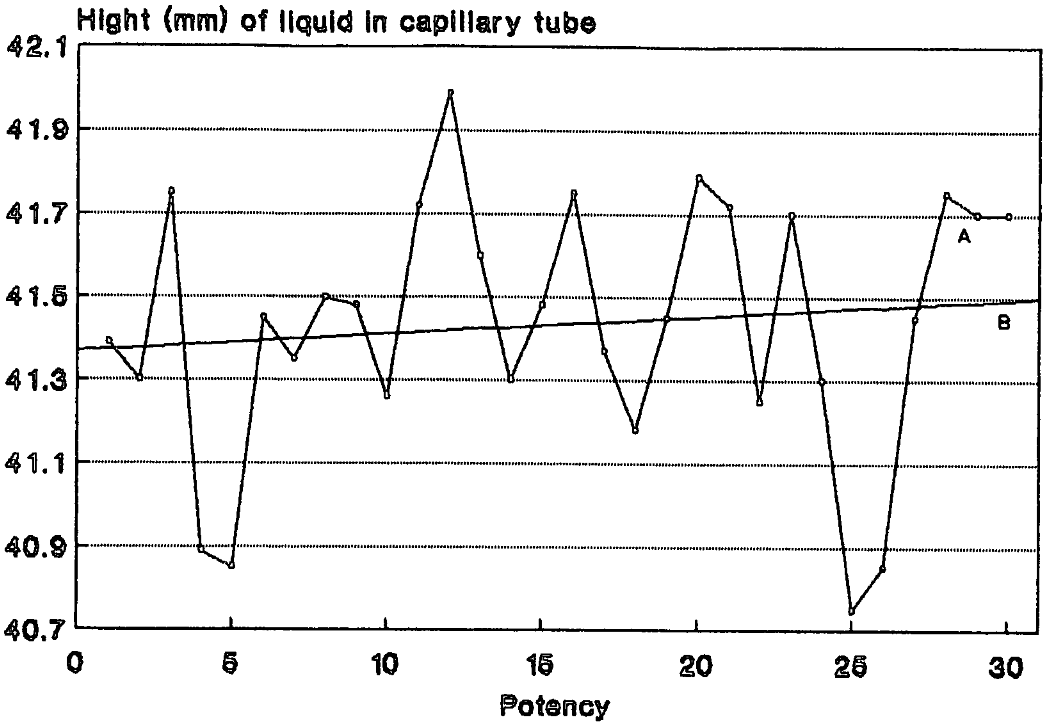

Fig 4.5 The rise (in mm) of LM potencies in a capillary tube
A as a straigt line graph and B as a trend

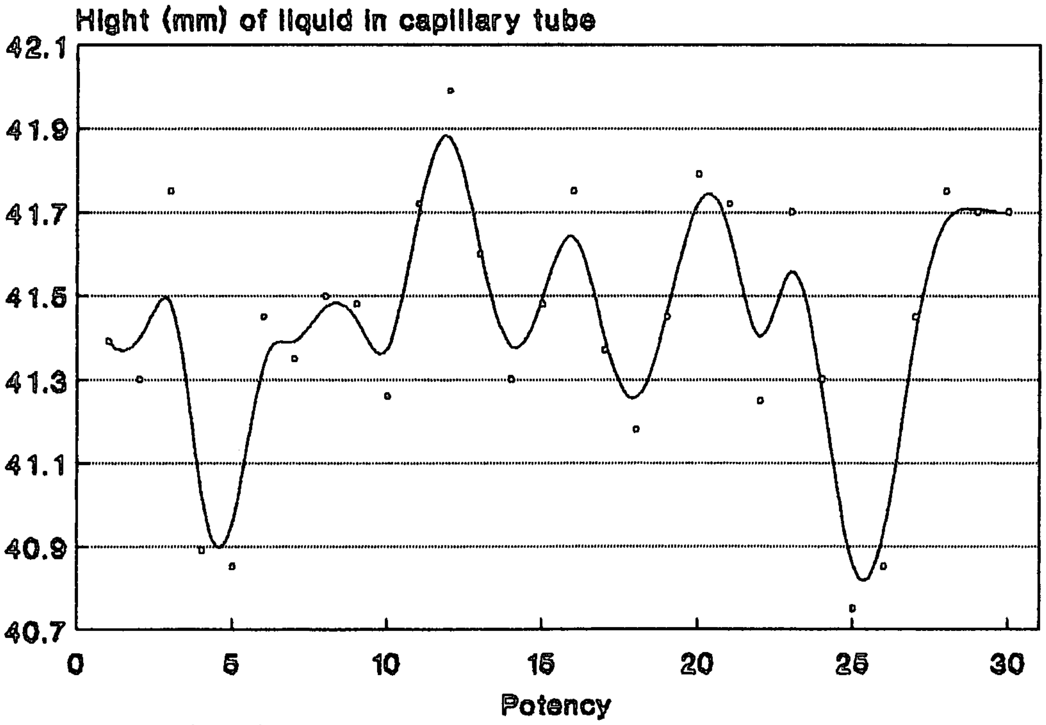

Fig 4.6 The rise (in mm) of LM potencies in a capillary tube as a curve

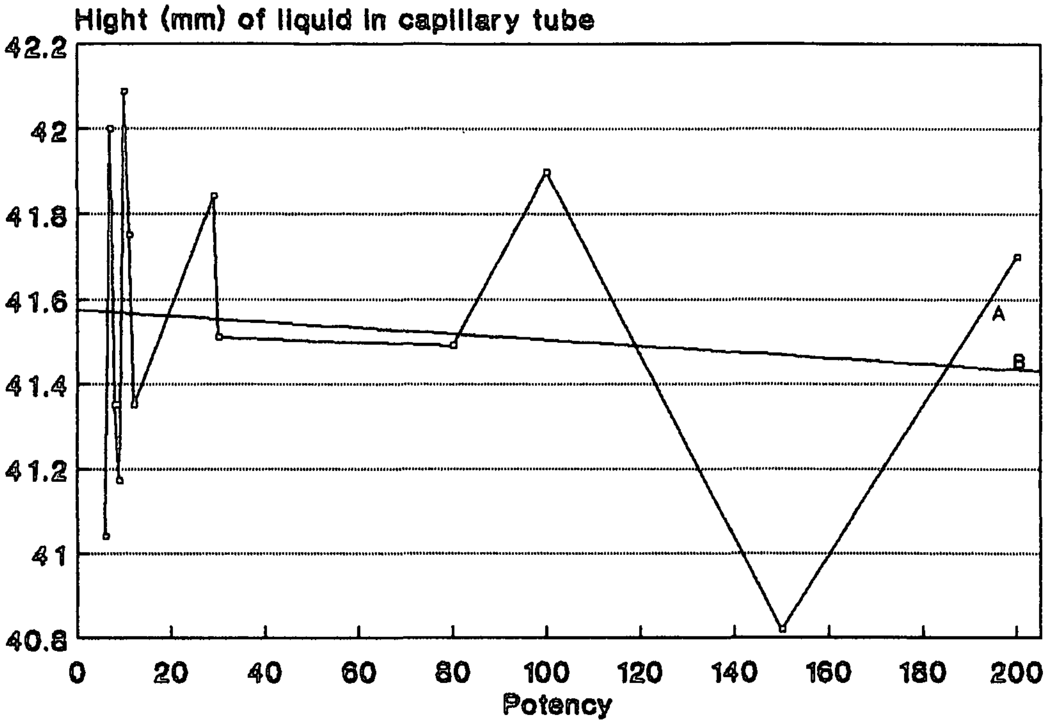

Fig 4.7 The rise (in mm) of K potencies (set one) in a capillary tube
A as a straight line graph and B as a trend

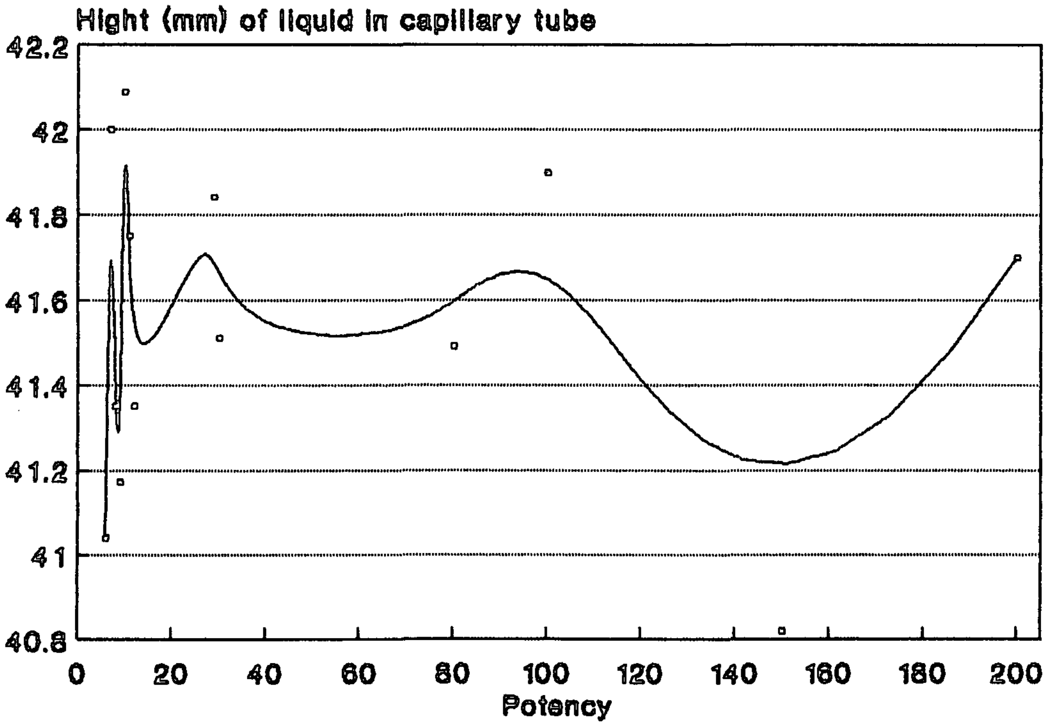

Fig 4.8 The rise (in mm) of K potencies (set one) in acapillary tube as a curve

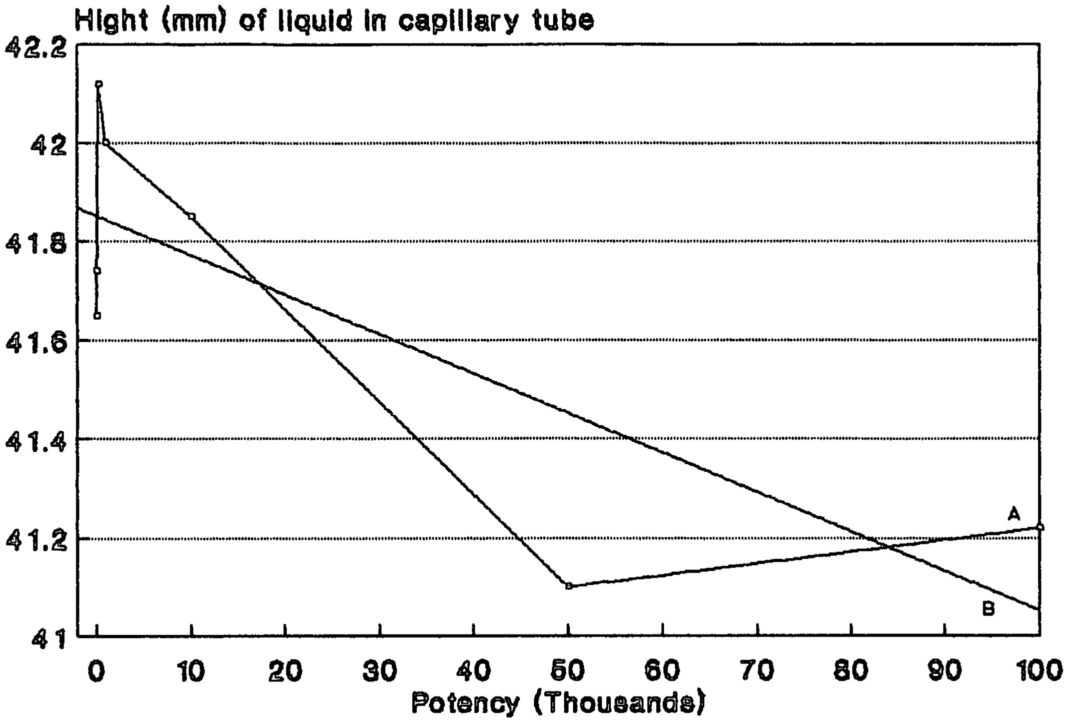

Fig 4.9 The rise (in mm) of K potencies (set two) in a capillary tube
A as a straight line graph and B as a trend

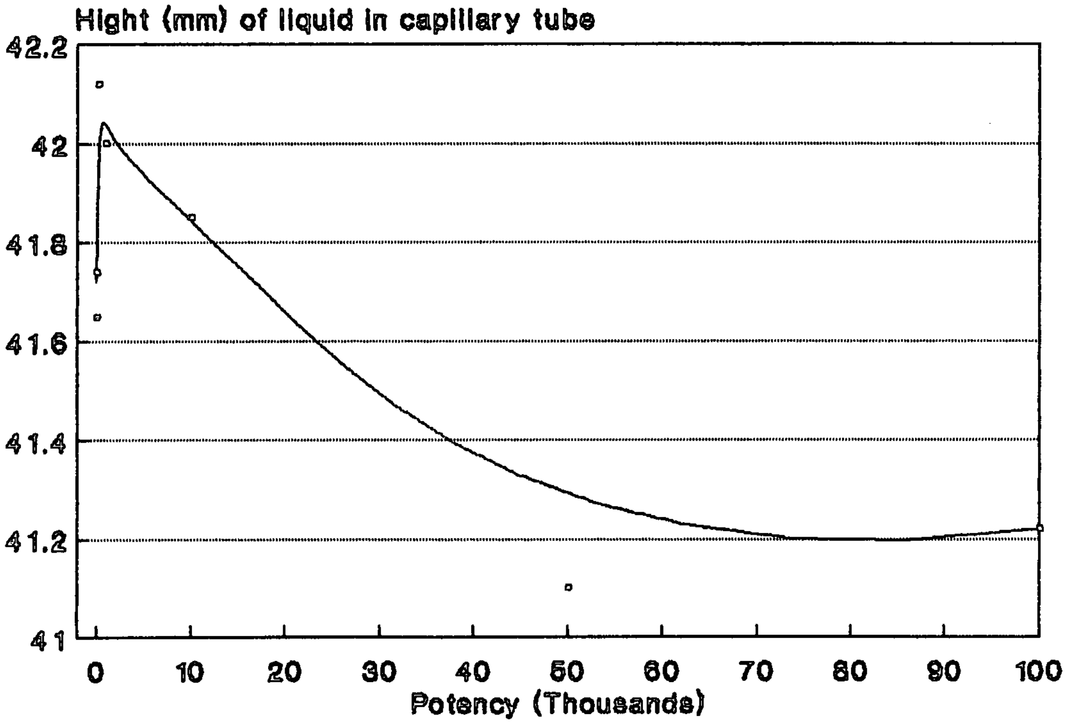

Fig 4.10 The rise (in mm) of K potencies (set two) in a capillary tube as a curve

In figures 4.11 to 4.17 the results of the three potency scales to be discussed are reprinted onto the same graph in order to enable comparison. As can be seen the K scale has been omitted.

In figures 4.11 to 4.15 the results are compared in relation to the deconcentration. The y-values are the rise of the liquid in the capillary tube in mm, and the x-values relate to the potencies' concentrations. In Fig. 4.11 all the readings have been recorded, thus comparing the readings to the DH scale, while in Figures 4.12 to 4.14 every second reading from the DH scale has been omitted, thus comparing the readings to the CH scale. In Fig. 4.15 only the readings with concentrations similar to that of the LM scale have been used. The potencies used are found printed in bold in Table B.6.

In Fig. 4.11 the relationship of the various potencies can be seen, although Figures 4.12 to 4.14 much more clearly illustrate this. In Fig. 4.12 the strong relationship of the potencies of all three scales can be seen at the concentration of 10^{20}, and also between the CH and DH scales at 10^{48}. Fig. 4.13 also clearly shows the affinity the CH and the DH scales have with each other. In Fig. 4.14 the trends of the three scales can be seen, and their similarity is clearly visible.
In Fig. 4.15 the relationship of the CH and DH potencies with relation to the LM potencies are shown. There are few similarities.

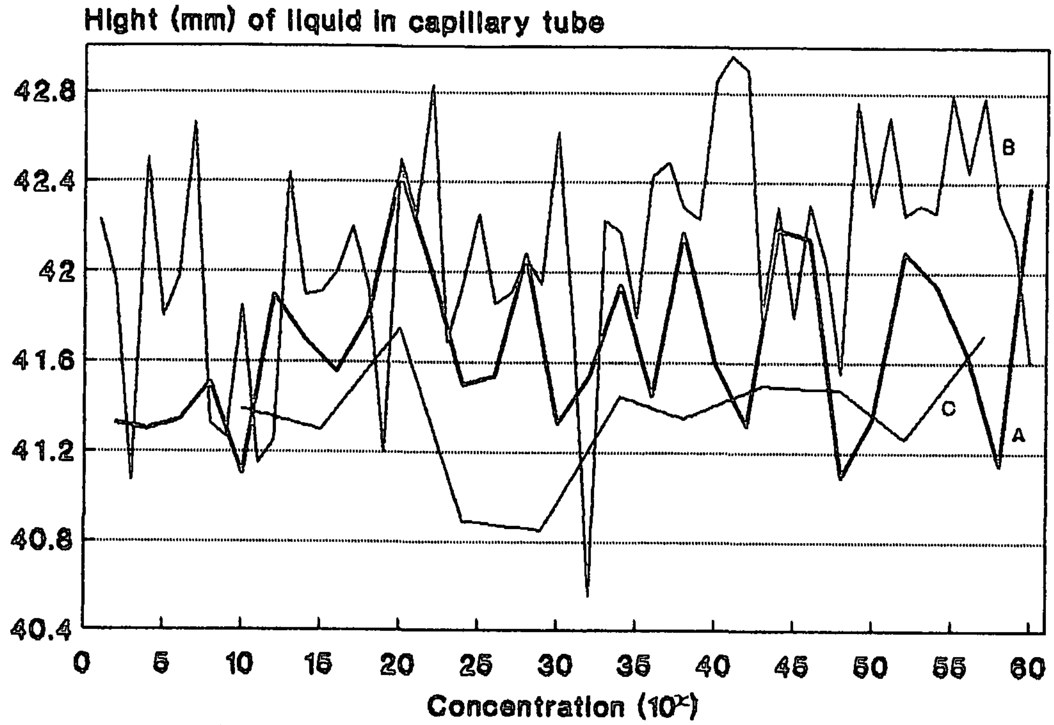

Fig 4.11 The rise (in mm) of potencies in a capillary tube with reference to their concentrations
A: CH Scale, B: DH Scale, C: LM Scale

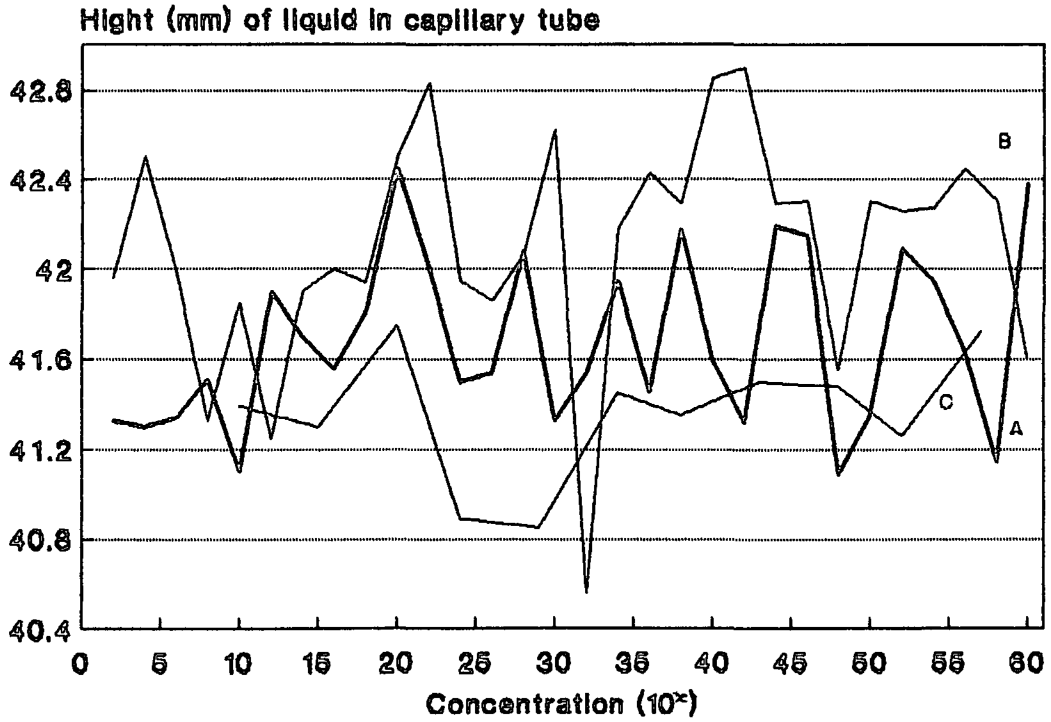

Fig 4.12 The rise (in mm) of potencies in a capillary tube with reference to their concentrations
A: CH Scale, B: DH Scale, C: LM Scale

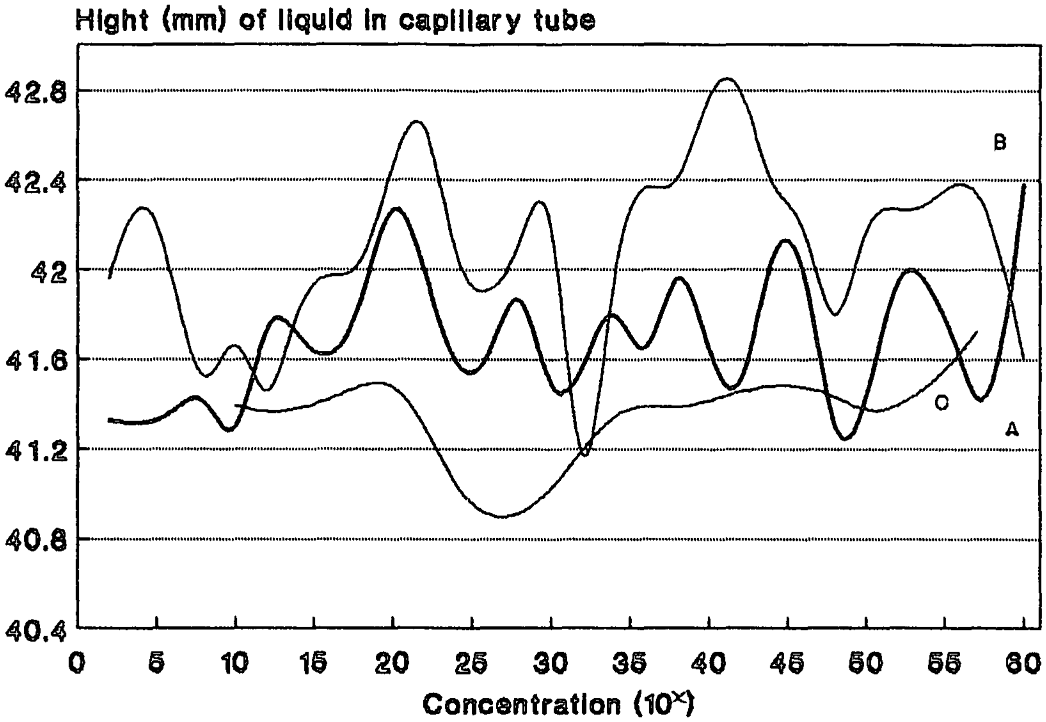

Fig 4.13 The rise (in mm) of potencies in a capillary tube with reference to their concentrations
A: CH Scale, B: DH Scale, C: LM Scale

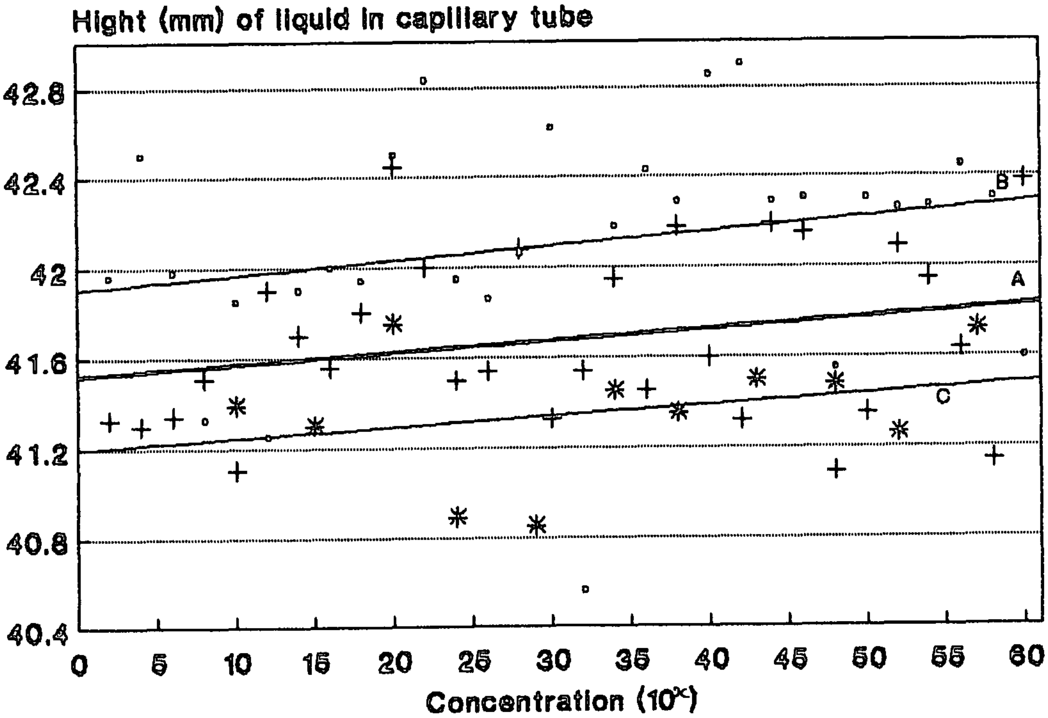

Fig 4.14 The rise (in mm) of potencies in a capillary tube with reference to their concentrations
A: CH Scale, B: DH Scale, C: LM Scale

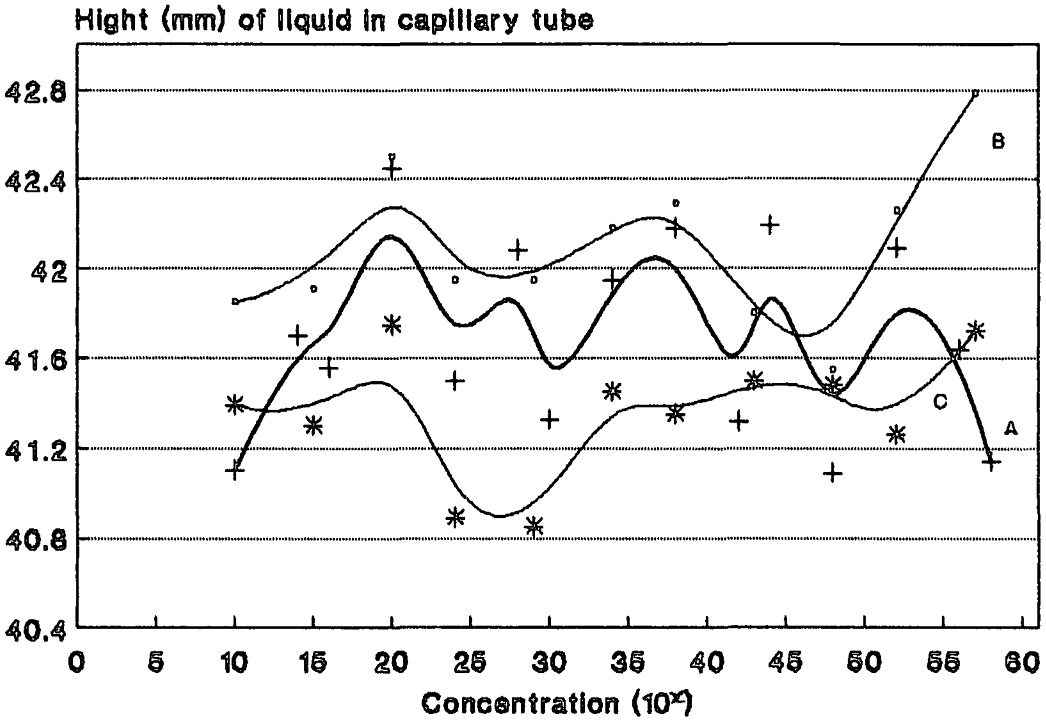

Fig 4.15 The rise (in mm) of potencies in a capillary tube with reference to their concentrations
A: CH Scale, B: DH Scale, C: LM Scale

In Figures 4.16 and 4.17 the results are compared in relation to the number of succussions applied to the potencies. The y-values are the rise of the liquid in the capillary tube in mm, and the x-values are the number of succussions applied (in hundreds). Very few similarities can be seen, but very interesting to note is the much stronger relationship between the DH and the LM scales, than with either of these two with the CH scale. They even have similar trends (Fig. 4.17).

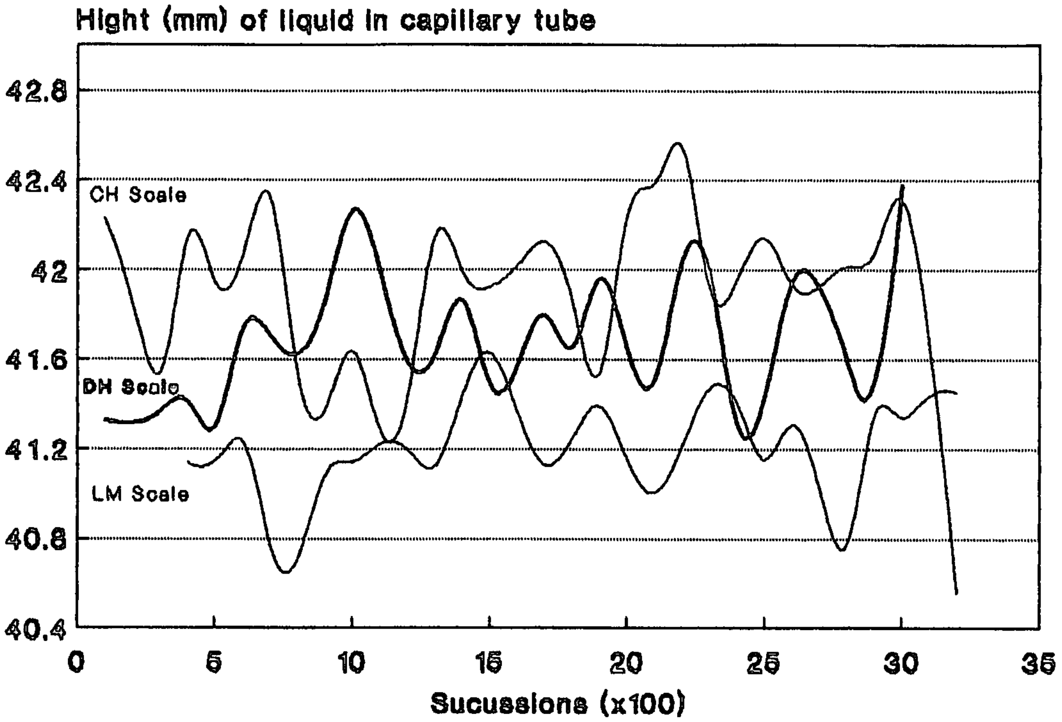

Fig 4.16 The rise (in mm) of Pulsatilla potencies in relation to the number of succussions.

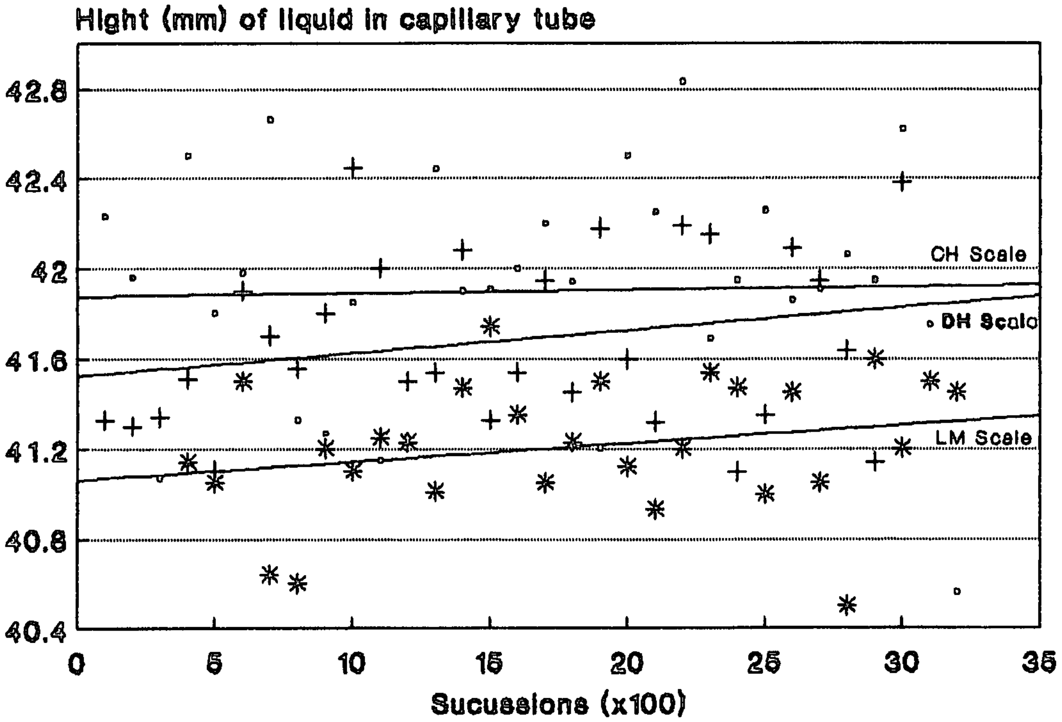

Fig 4.17 The rise (in mm) of Pulsatilla potencies in relation to the number of succussions.

The data from Appendix B were used to calculate the correlation coefficients between the various potency scales. The correlation coefficients of the potency scales are A) in terms of concentration (Table B.6.) and B) in relation to number of succussions (Table B.7.).

A) Correlation coefficients with reference to concentration:

CH and DH potencies: 0.064154
CH and LM potencies: 0.351432
DH and LM potencies: 0.479287

B) Correlation coefficients with reference to number of succussions:

CH and DH potencies: 0.023600
CH and LM potencies: 0.094578
DH and LM potencies: -0.266136

4.3. THE ELECTRICAL CONDUCTIVITY OF POTENCIES

The following figures and graphs are the graphic representation of the experimental findings for the determination of the electrical conductivity of potencies. The full results were tabulated and are available in Appendix C.

Except where otherwise noted the y-values are the conductivity of the potencies measured in milli-Siemens (mS), and the x-values relates to the specific potency.

Figures 4.18 to 4.20 show the results of the conductivity experiments done on the CH potencies. In Fig. 4.18 all the results are displayed, whereas in Figures 4.19 and 4.20 the first potency was omitted. This was done to be able to increase the size of the graph. Fig. 4.19 shows the results as a straight line graph and as a trend. The trend shows an upward motion. In Fig. 4.20 a sinusoidal graph is seen. The conductivity of the first potency is very high due to the very high concentration of the Pulsatilla tincture present.

Figures 4.21 to 4.23 show the results of the conductivity experiments done on the DH potencies. In Fig. 4.21 all the results are displayed, but in Figures 4.22 and 4.23 the first two potencies are omitted for practical reasons. Fig. 4.22 show the results as a straight line graph and as a trend. The trend shows a marked increase. In Fig. 4.23 the sinusoidal nature of the results are seen.

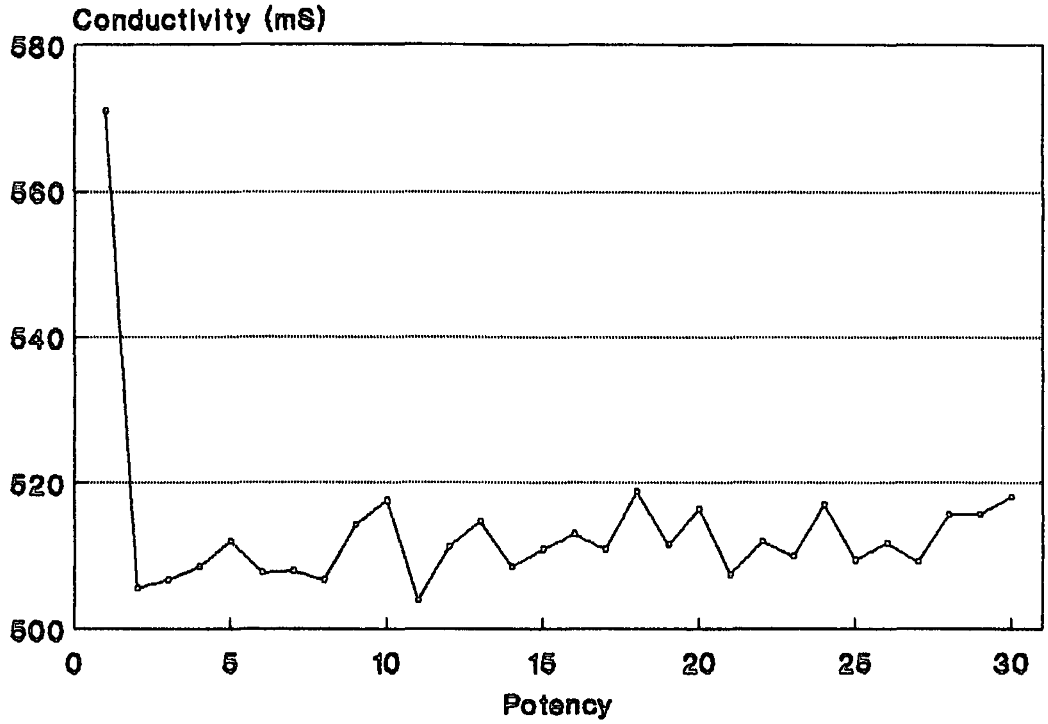

Fig 4.18 The Electrical Conductivity (in mS) of CH Potencies

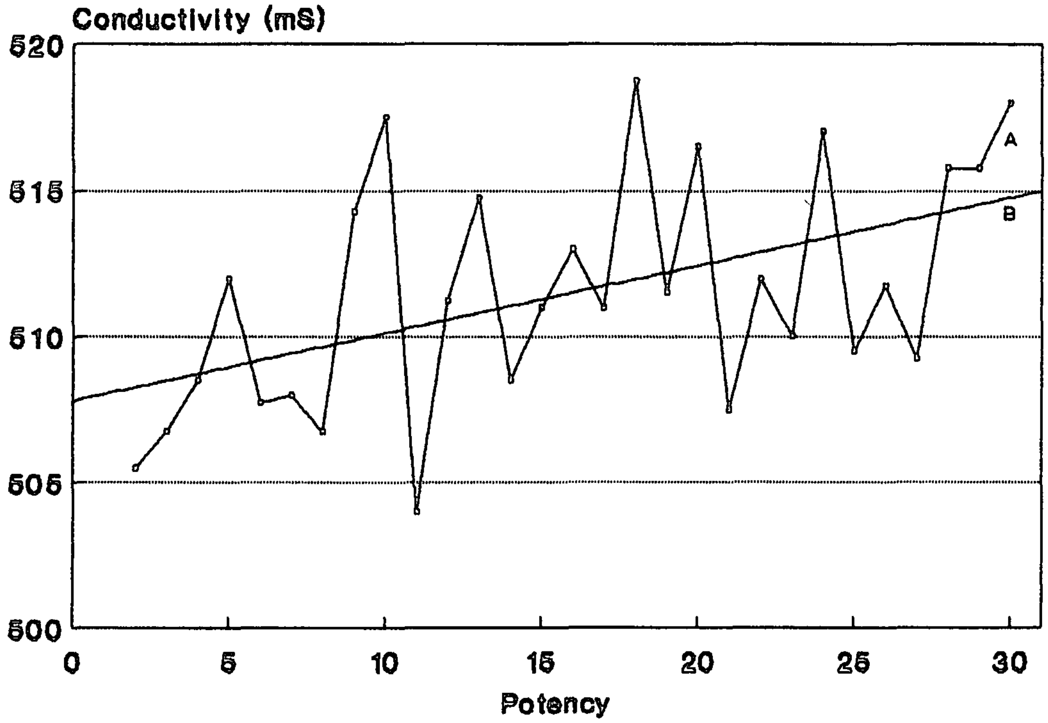

Fig 4.19 The Electrical Conductivity (in mS) of CH Potencies
with A as a straight line graph and B as a trend

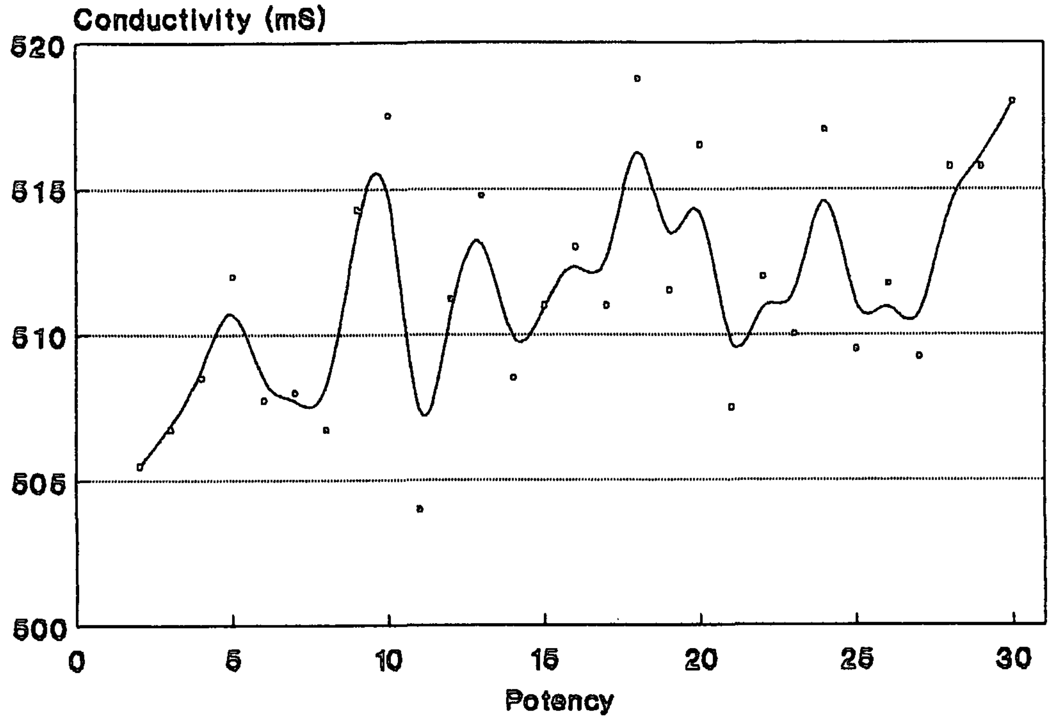

Fig 4.20 The Electrical Conductivity (in mS) of CH Potencies as a curve

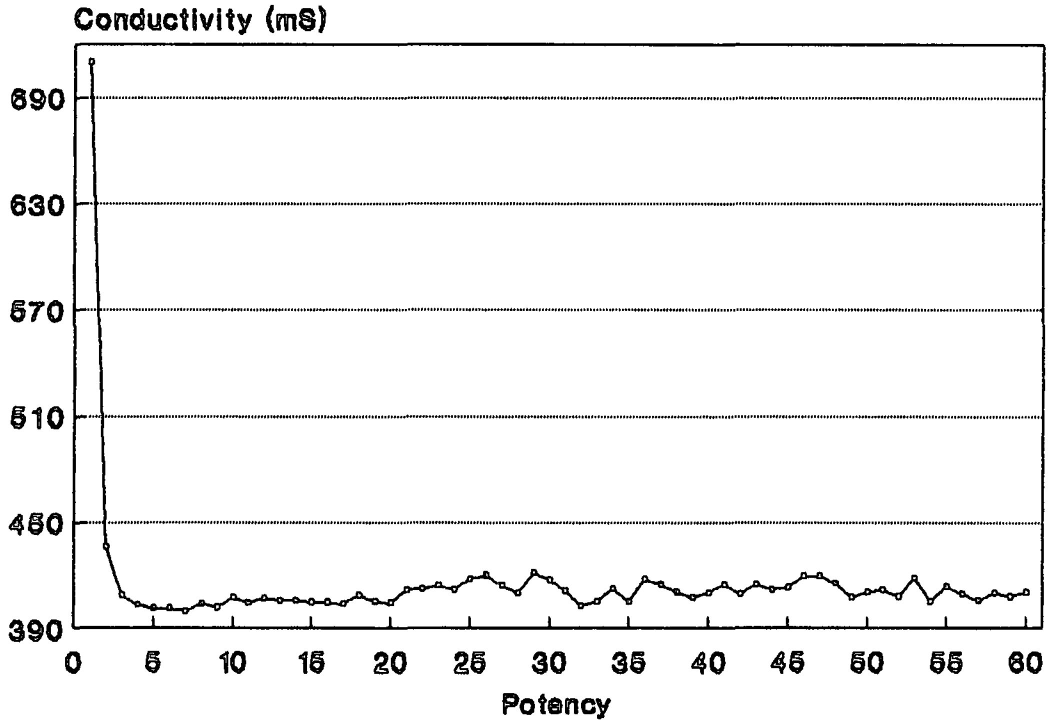

Fig 4.21 The Electrical Conductivity (in mS) of DH potencies

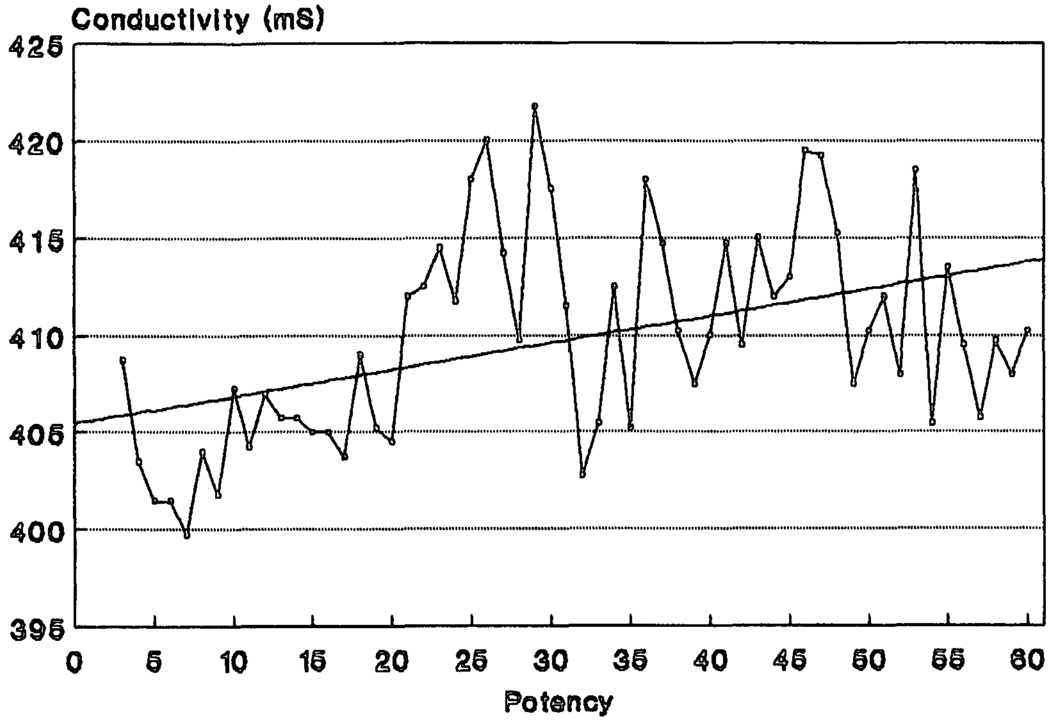

Fig 4.22 The Electrical Conductivity (in mS) of DH potencies with A as a straight line graph and B as a trend

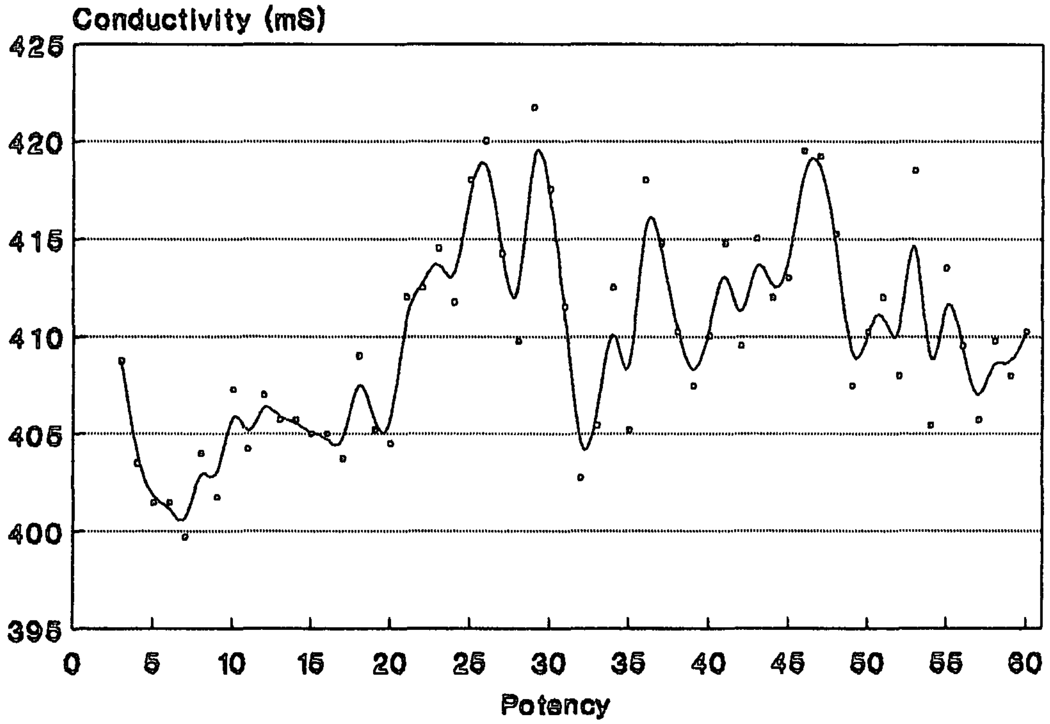

Fig 4.23 The Electrical Conductivity (in mS) of DH potencies as a curve

Figures 4.24 and 4.25 show the results of the conductivity experiments done on the LM potencies. In Fig. 4.24 the results are displayed as a straight line graph and as a trend. The trend is nearly a flat line, showing only a very minute upward motion. In Fig. 4.25 the data is represented as a curve, and an uncomplicated sinusoidal graph can be seen.

In figures 4.26 to 4.29 the results of the conductivity experiments done on the K potencies are shown. Figures 4.26 and 4.27 show the results of the first potency series, and figures 4.28 and 4.29 of the second. In figures 4.26 and 4.28 the results are displayed as straight line graphs and as trends. Interesting to note is that although the trend is downward in Fig. 4.26, the trend of Fig. 4.28 is upward. In Figures 4.27 and 4.29 the data is represented as curves. Note that after the 80th potency (Fig. 4.27) little change is present.

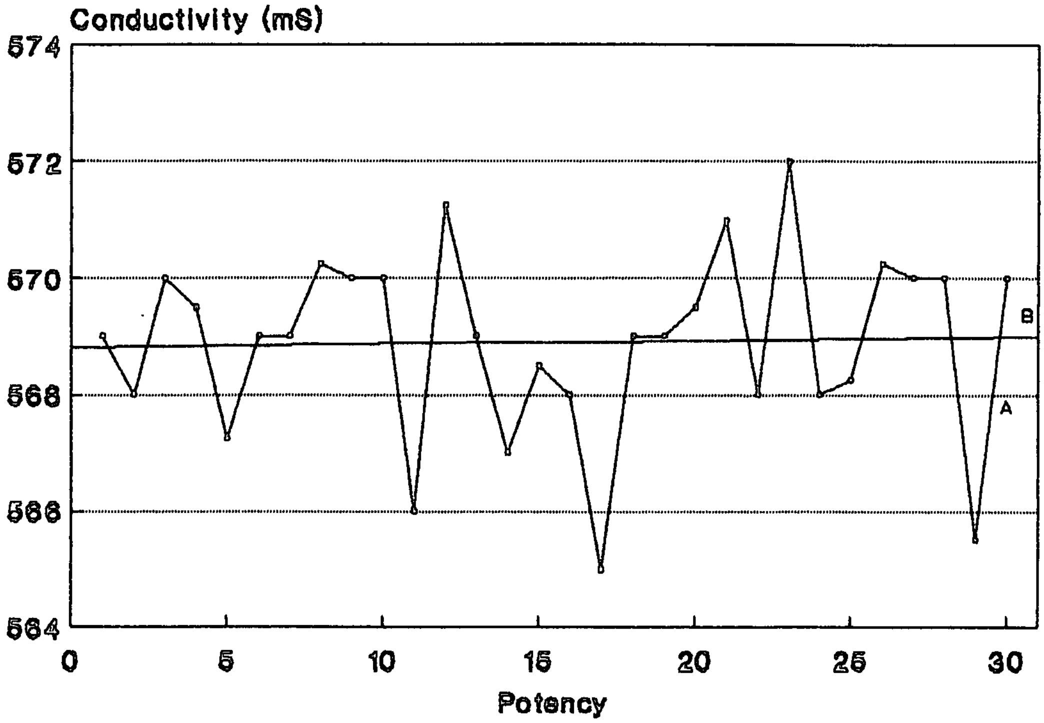

Fig 4.24 The Electrical Conductivity (in mS) of LM potencies with A as a straight line graph and B as a trend

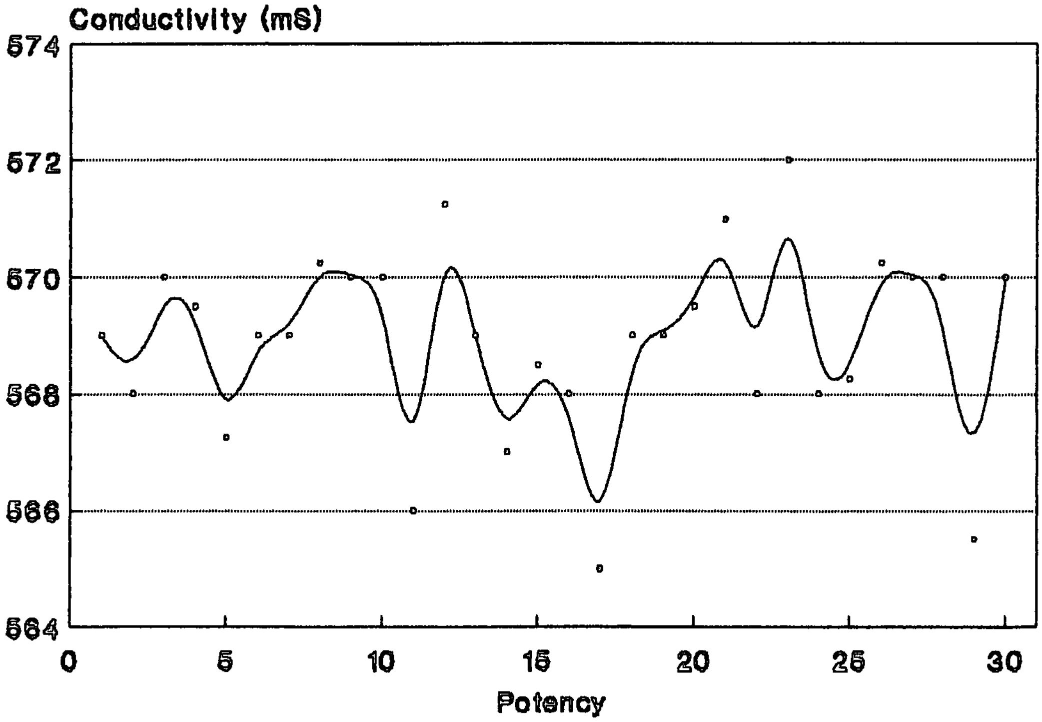

Fig 4.25 The Electrical Conductivity (in mS) of LM potencies as a curve

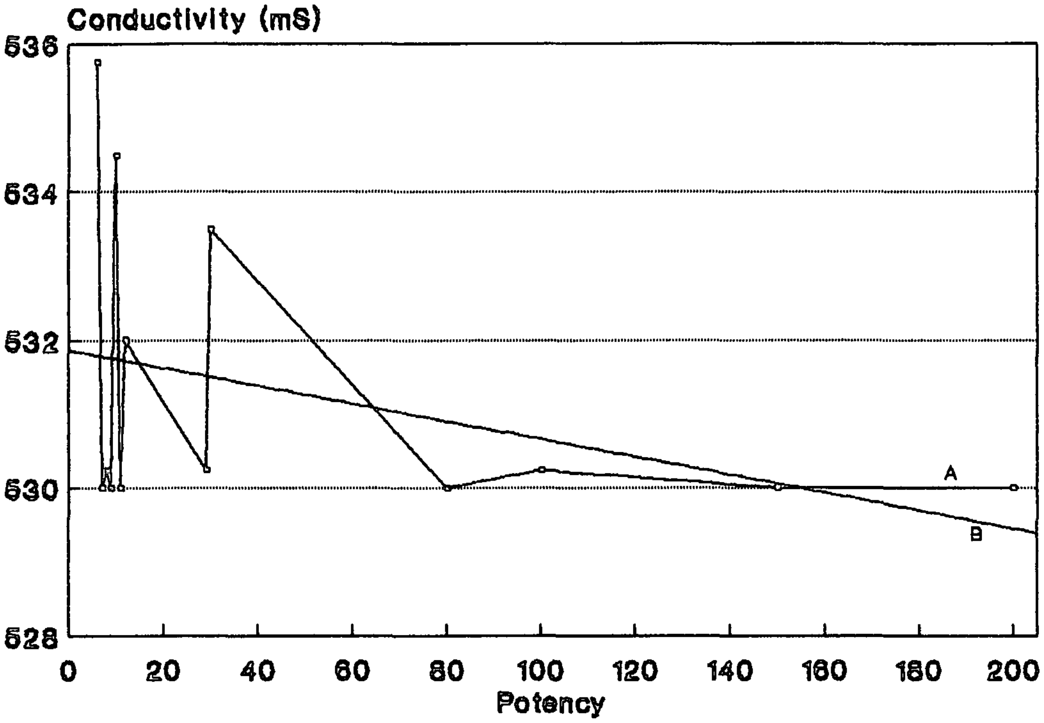

Fig 4.26 The Electrical Conductivity (in mS) of K potencies
with A as a straight line graph and B as a trend (Set one)

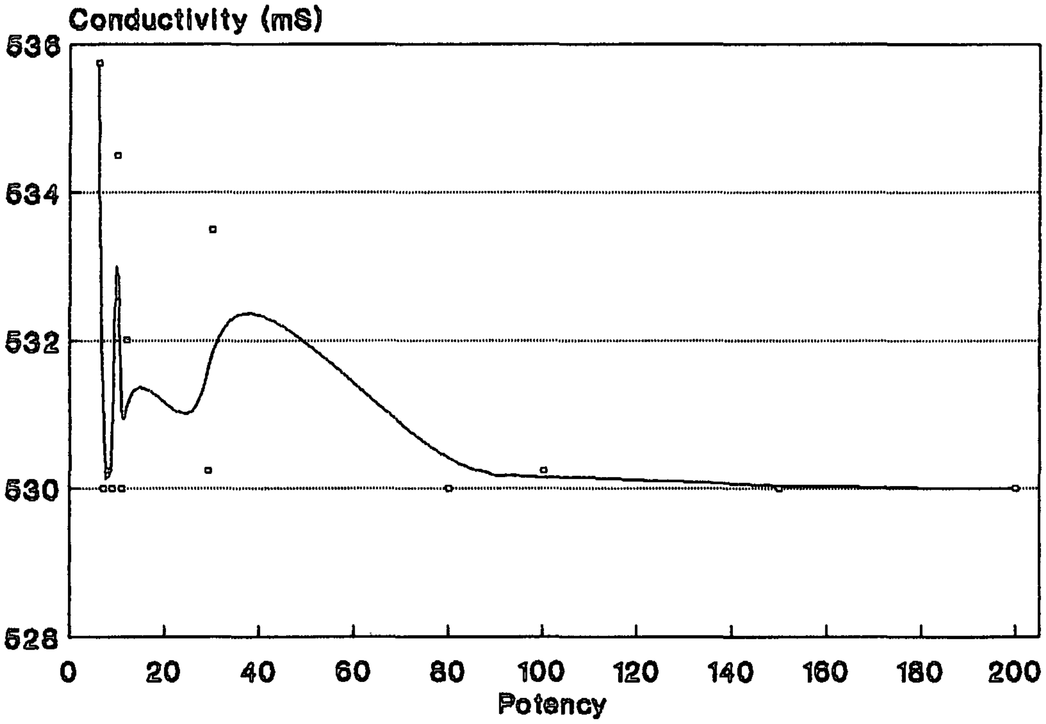

Fig 4.27 The Electrical Conductivity (in mS) of K potencies as a curve (Set one)

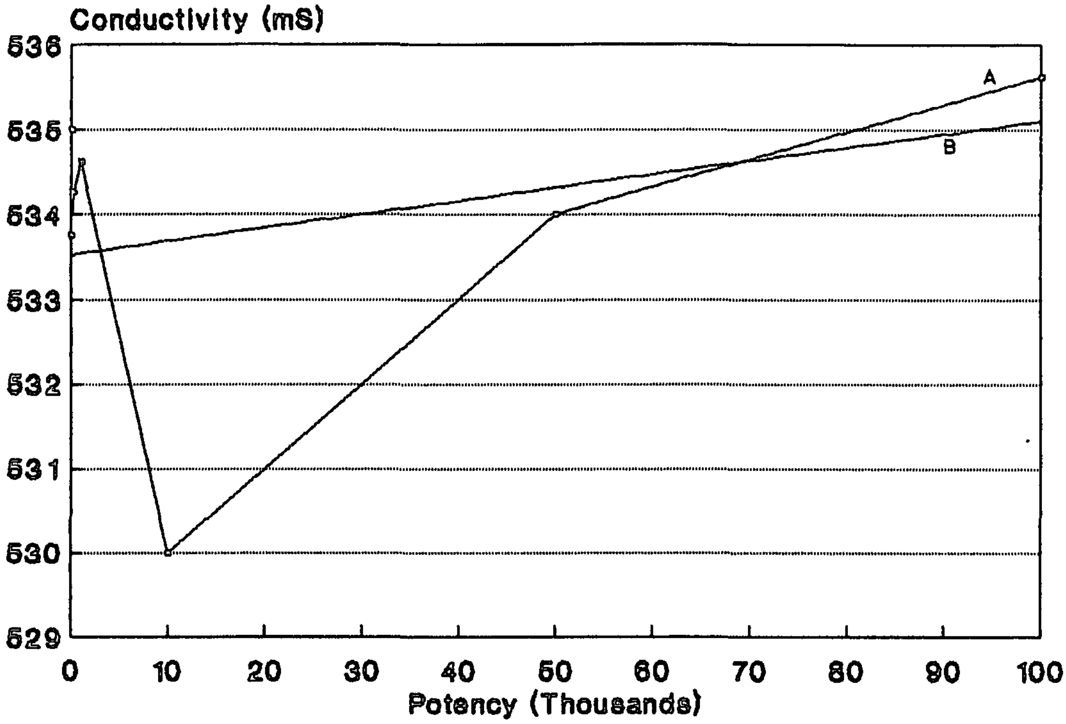

Fig 4.28 The Electrical Conductivity (in mS) of K potencies with A as a straight line graph and B as a trend (Set two)

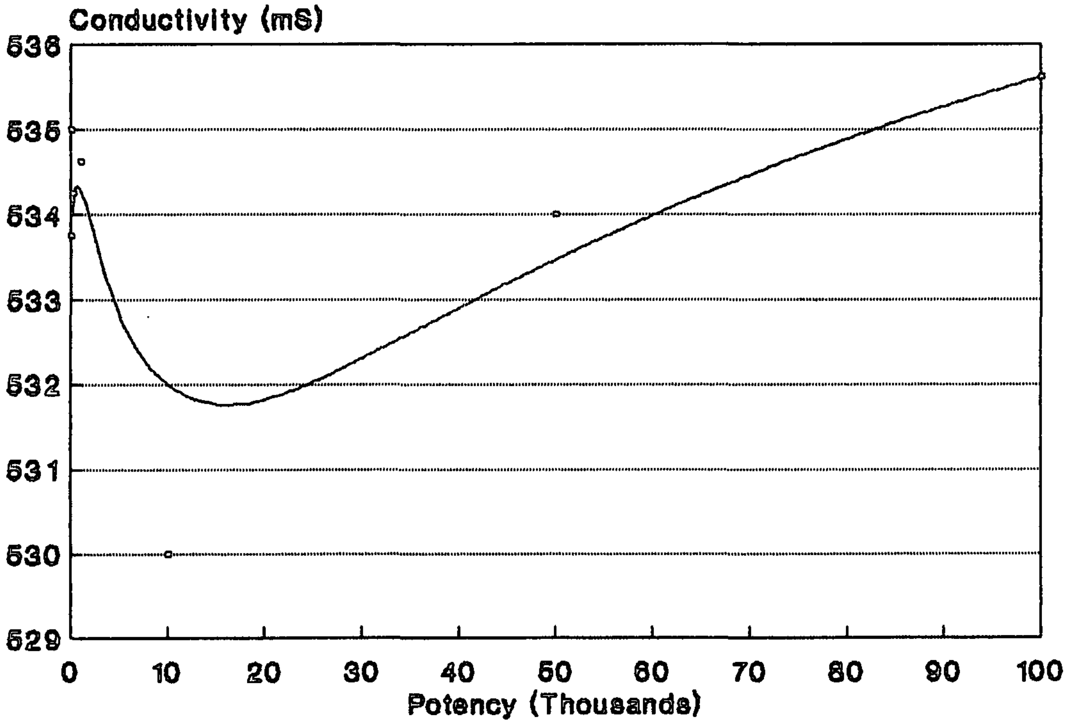

Fig 4.29 The Electrical Conductivity (in mS) of K potencies as a curve (Set two)

In Figures 4.30 to 4.38 the results of the three potency scales are reprinted onto the same graph in order to enable comparison. Once again the K scale has been omitted.

In Figures 4.30 to 4.35 the results are compared in relation to the deconcentration. The y-values are the conductivities of the potencies (in mS), and the x-values relate to the potencies' concentrations. In Fig. 4.30 all the readings have been recorded, but in further graphs the first potencies were omitted as before, and the values of the readings were adjusted in order to superimpose them. In Fig. 4.31 the remainder of the readings were used, thus producing a graph where the CH and LM scales are compared to the DH scale, while in Figures 4.32 and 4.33 every second reading from the DH scale has been omitted, thus comparing the readings to the CH scale. Note the similarities at the 10^{36} concentration. The DH and CH scales compare favourably with each other, but neither with the LM scale. In Fig. 4.34 the trend of the three scales is shown. Once again the DH and the CH scales compare well, but the LM scale is definitely different. In Fig. 4.35 only the readings with concentrations similar to that of the LM scale have been used. The potencies used are marked in Table C.6. Very few similarities are seen.

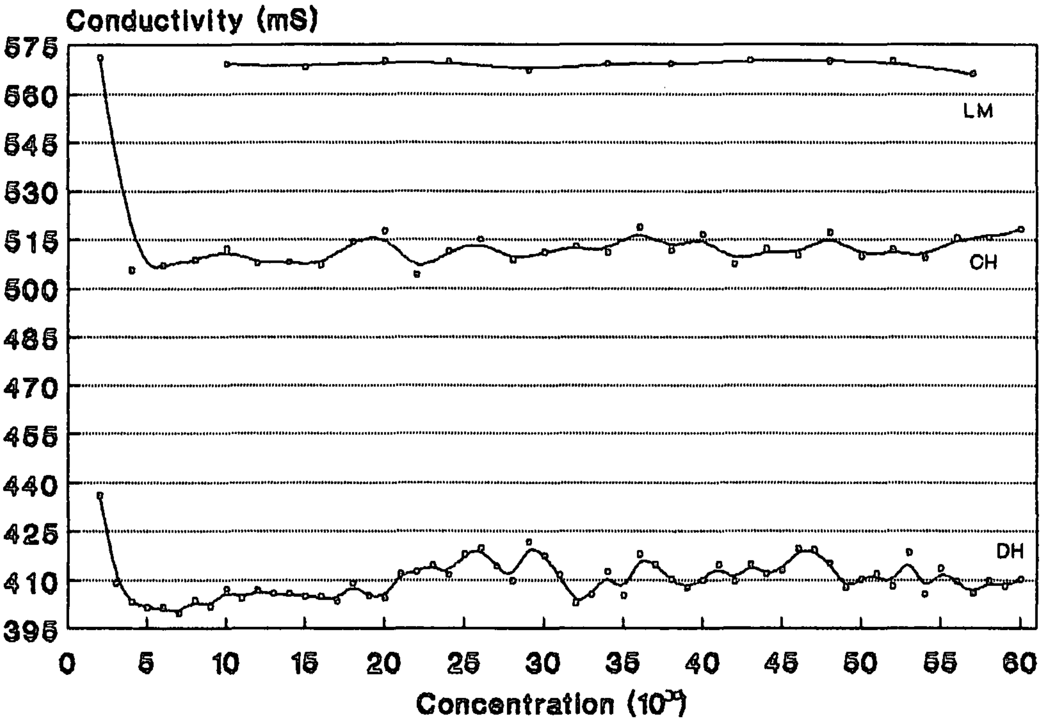

Fig 4.30 The Electrical Conductivity (in mS) of potenoles inrelation to their concentration.

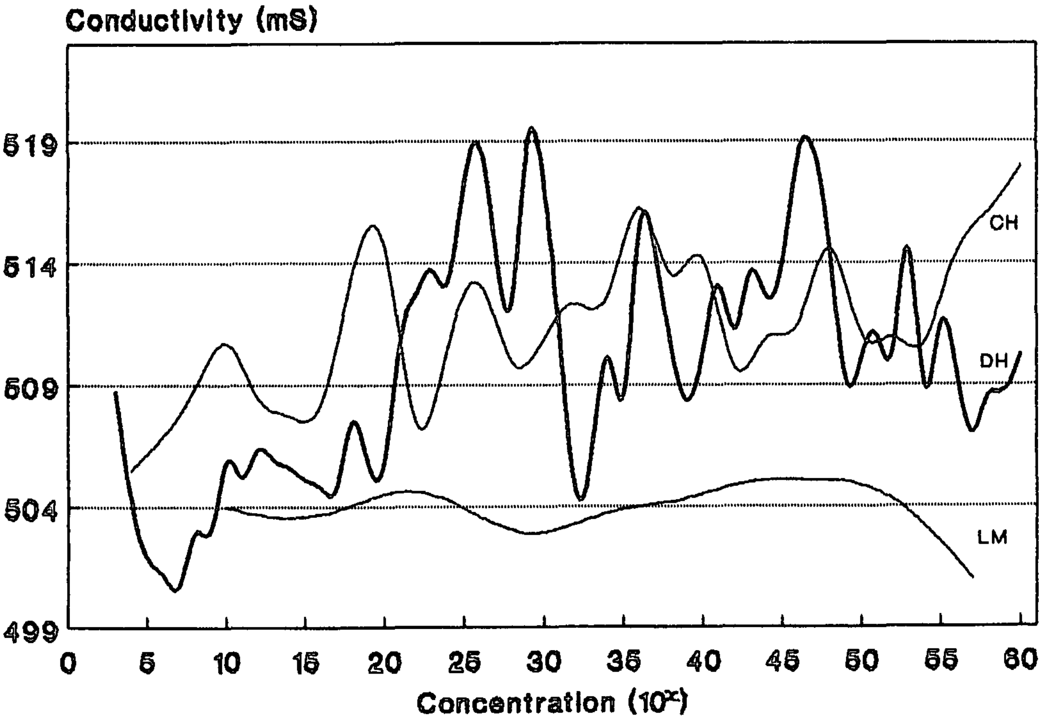

Fig 4.31 The Electrical Conductivity (in mS) of potenoles in relation to their concentration.

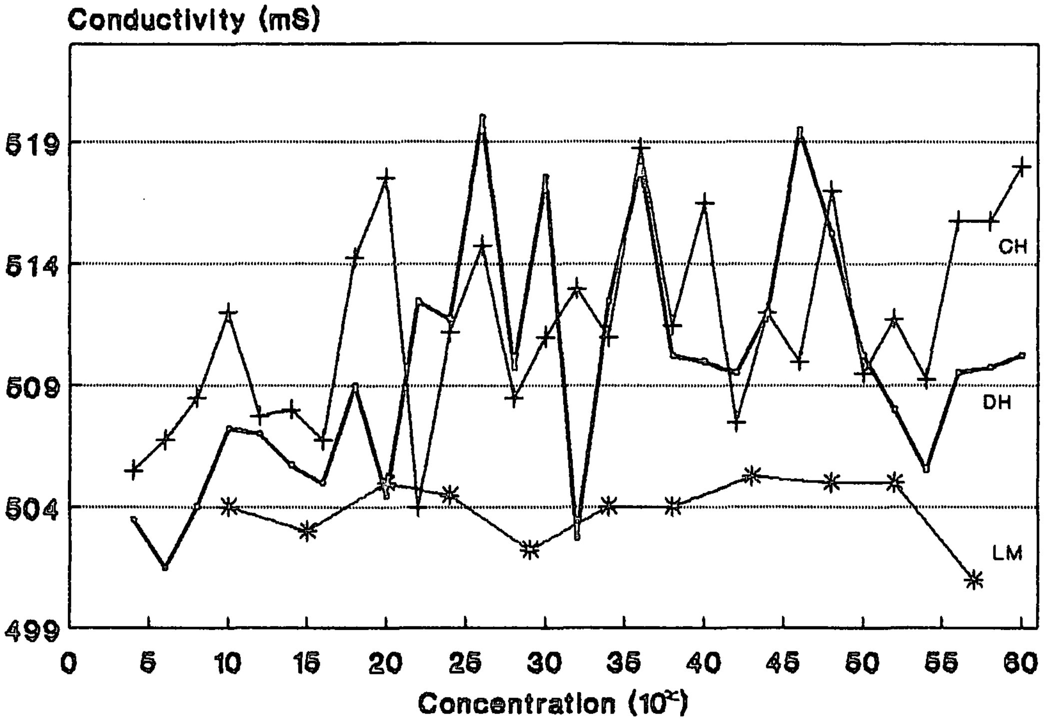

Fig 4.92 The Electrical Conductivity (in mS) of Potenoles in relation to their concentration.

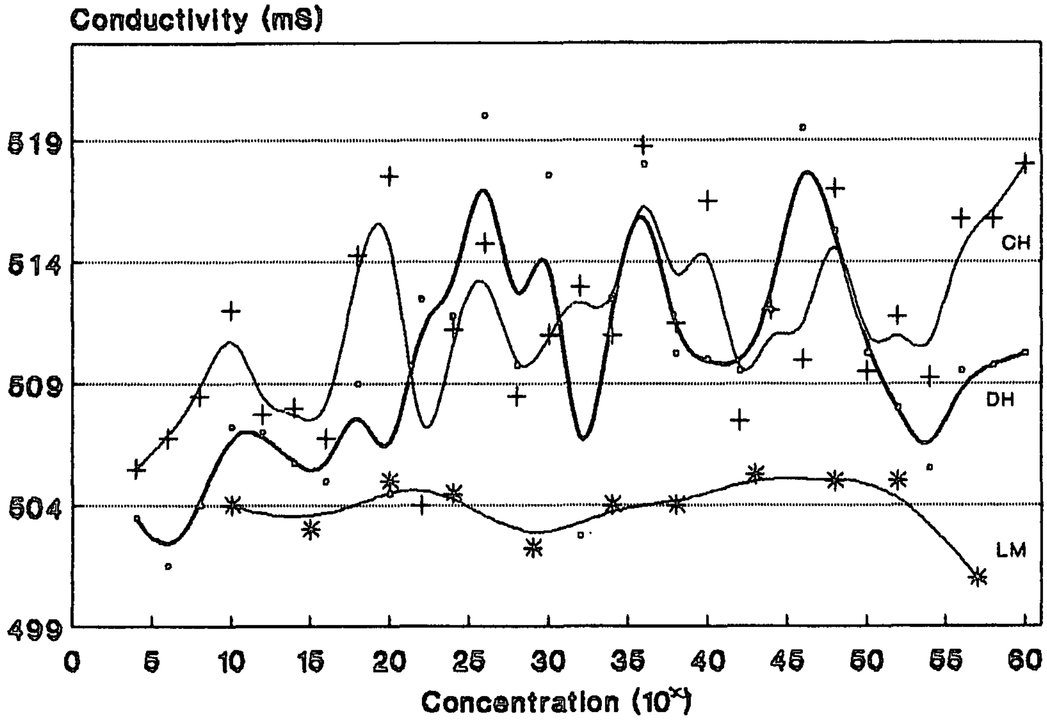

Fig 4.93 The Electrical Conductivity (in mS) of Potenoles in relation to their concentration.

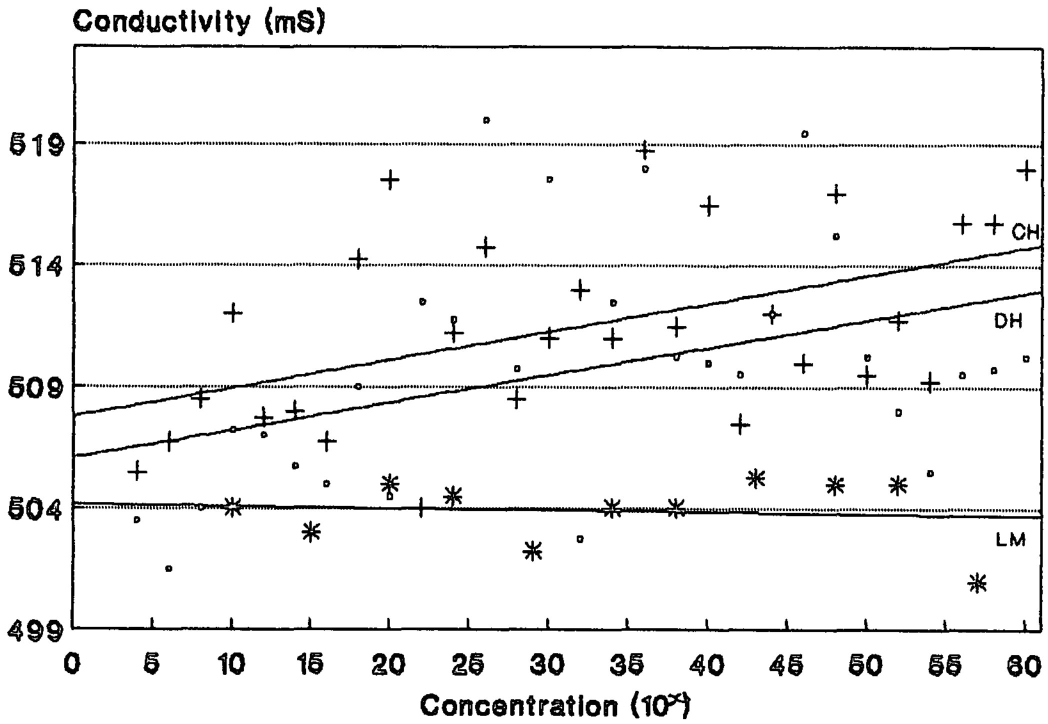

Fig 4.34 The Electrical Conductivity (in mS) of Potencies in relation to their concentration as trends.

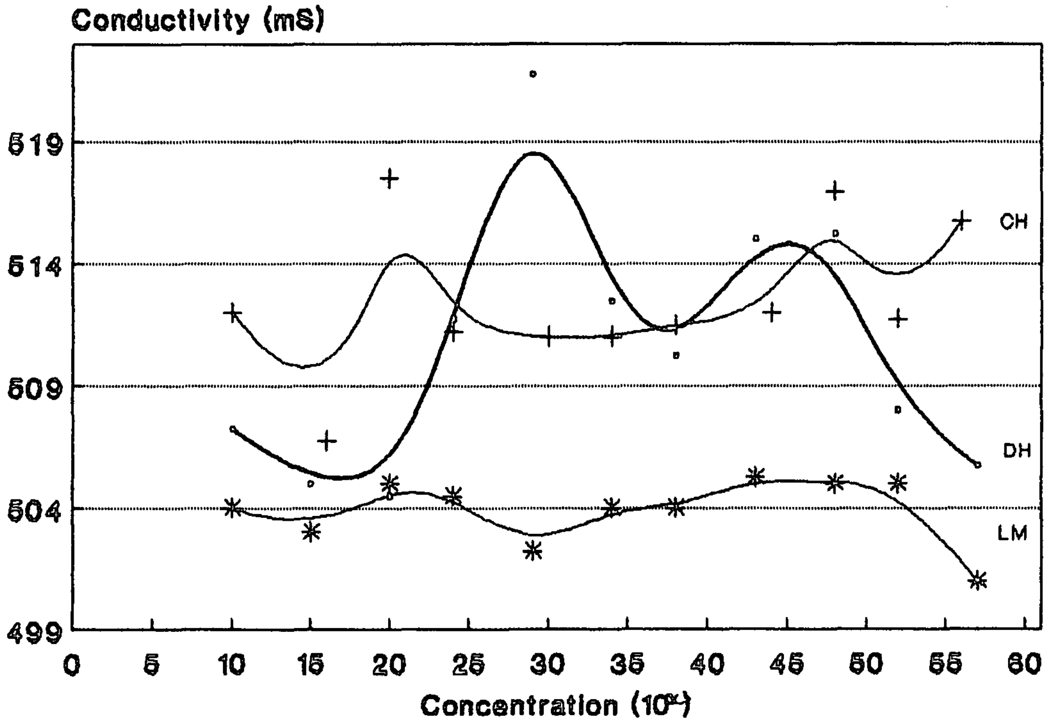

Fig 4.36 The Electrical Conductivity (in mS) of Potencies inrelation to their concentration.

In Figures 4.36 to 4.38 the results are compared in relation to the number of succussions applied to the potencies. The y-values are the rise of the liquid in the capillary tube in mm, and the x-values are the number of succussions applied (in hundreds). In Fig. 4.36 all potencies were used, and as before the first potencies were omitted and the values of the readings were adjusted in order to superimpose them in Figs. 4.37 and 4.38. Some similarities can be seen. The trends of the CH and DH scales are similar, both increasing, but the trend of the LM scale is nearly a flat line (Fig. 4.38).

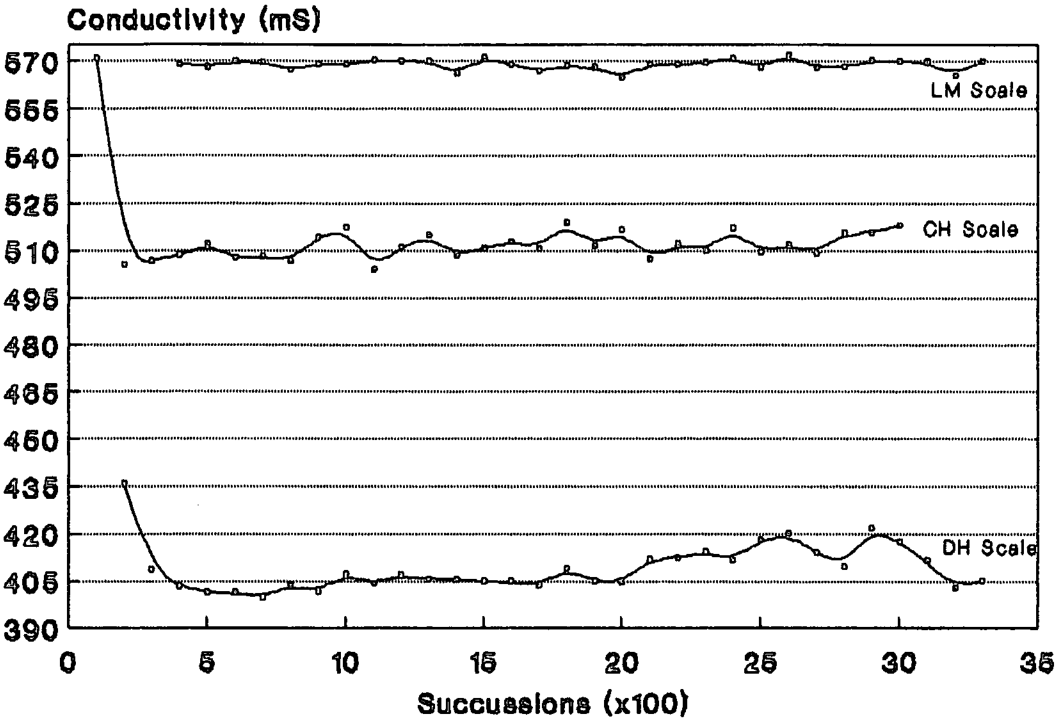

Fig 4.36 The Electrical Conductivity (in mS) of potencies according to the number of succussions

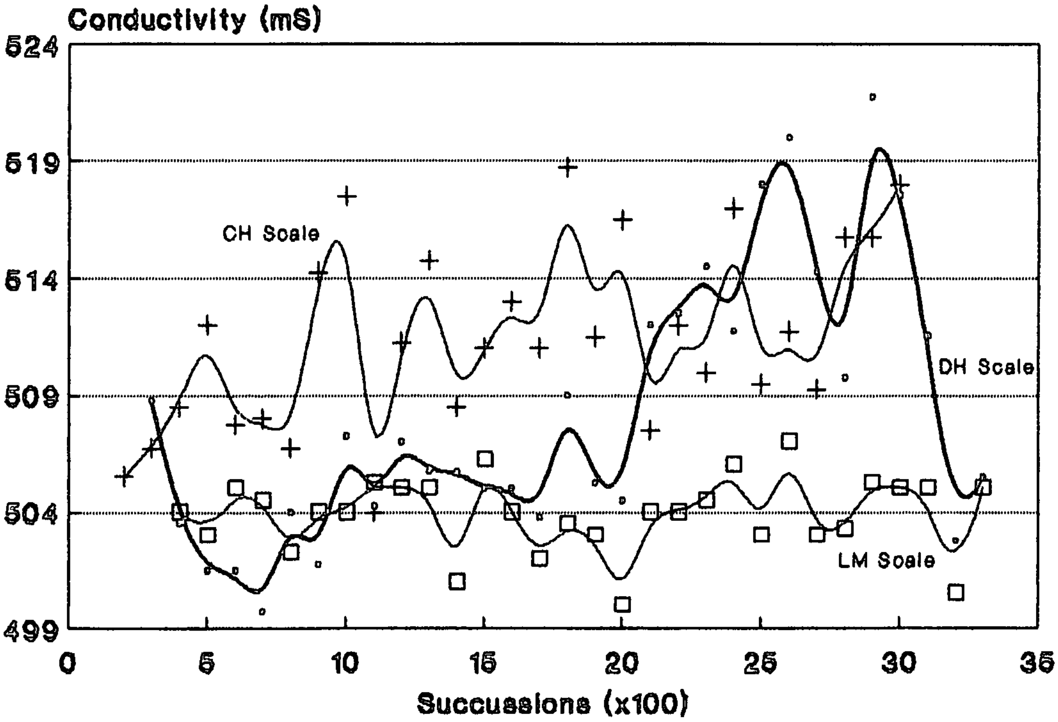

Fig 4.37 The Electrical Conductivity (in mS) of potencies according to the number of succussions

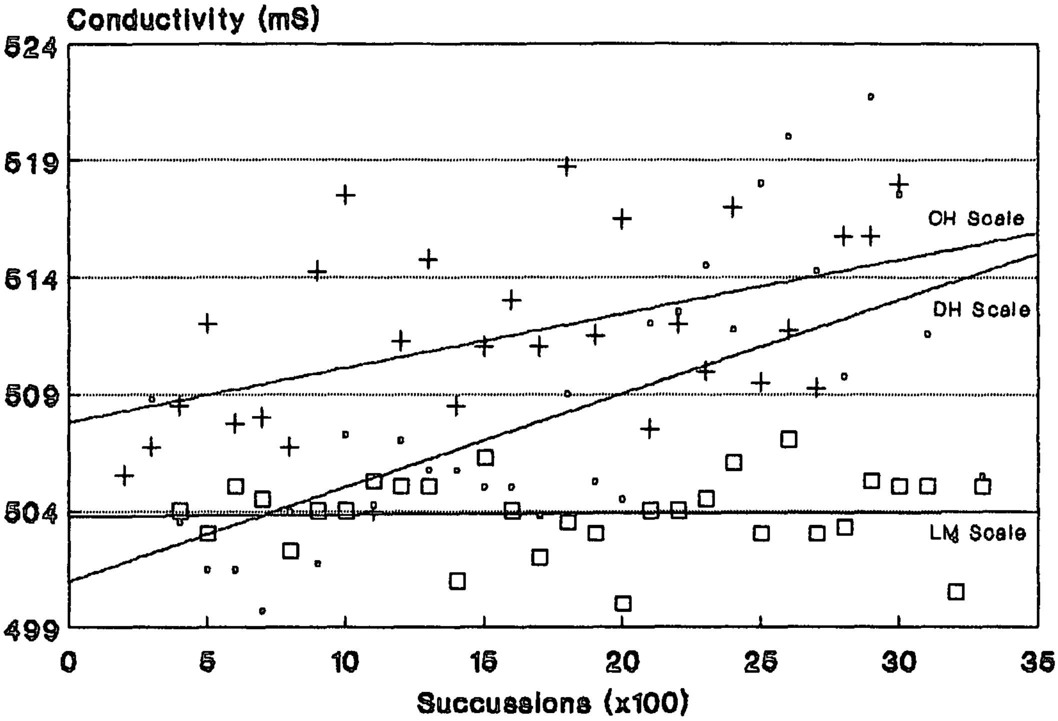

Fig 4.36 The Electrical Conductivity (in mS) of potencies according to the number of succussions

The data from Appendix C were used to calculate the correlation coefficients between the various potency scales. The correlation coefficients of the potency scales are A) in terms of concentration (Table C.6.) and B) in relation to number of succussions (Table C.7.).

A) Correlation coefficients with reference to concentration:

CH and DH potencies: 0.743551
CH and LM potencies (Numbers in bold): 0.147470
DH and LM potencies (Numbers in bold): 0.387126

B) Correlation coefficients of potencies in relation to succussions:

CH and DH potencies: 0.930550
CH and LM potencies: 0.026221
DH and LM potencies: 0.353624

4.4. COMPARISON OF SURFACE TENSION TO ELECTRO-CONDUCTIVITY WITH RELATION TO SPECIFIC POTENCY SCALES.

This section is divided into four subsections, each of them dealing with a specific potency scale (CH, DH, LM, K). In each case the data as in Appendices B and C have been used.

4.4.1. THE CENTESIMAL HAHNEMANNIAN SCALE

The following graphs are the graphical representation of the results showing the relationship between the surface tension and the electrical conductivity of CH potencies.

Fig. 4.39 the results are displayed as a straight line graph, and in Fig. 4.40 as trends. In Fig. 4.39 it is interesting to note that although there are similarities between the two experimental methods, there are just as many differences. In Fig. 4.40 both the trends show an upward movement, but they are definitely not the same.

The correlation coefficient (r) between the two data sets is -0.1423 if all the readings are used, and 0.0566 if the first potency is omitted.

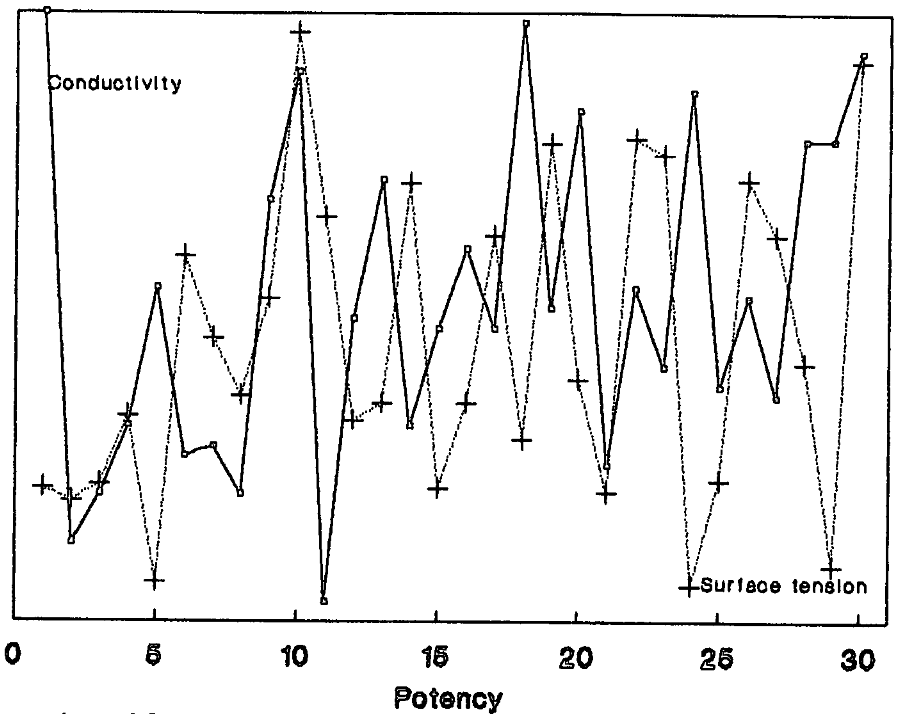

Fig 4.39 Comparison of Conductivity and Surface Tension of CH potencies

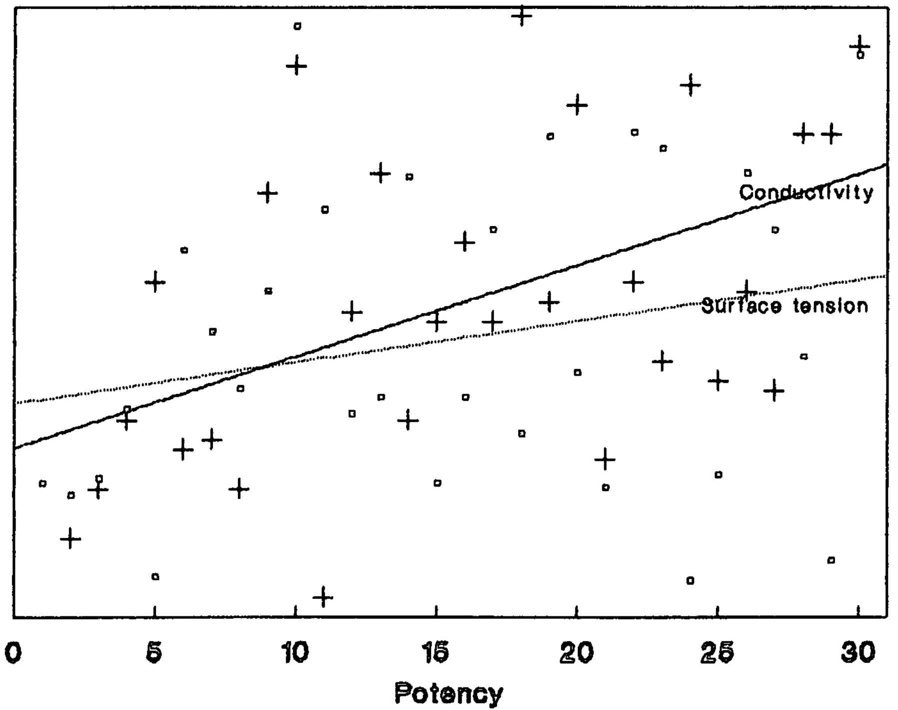

Fig 4.40 Comparison of Conductivity and Surface Tension of CH potencies

4.4.2. THE DECIMAL HAHNEMANNIAN SCALE

The following two graphs are the graphical representation of the results showing the relationship between the surface tension and the electrical conductivity of DH potencies.

Fig. 4.41 the results are displayed as a straight line graph, and in Fig. 4.42 as trends. In Fig. 4.41 it is important to note both the similarities and the differences between the two graphs. Note the close correlation at potencies 28 to 36. Both the trends are upward (Fig. 4.42), but their gradients are different.

The correlation coefficient (r) between the two sets of data is 0.0640, and 0.1767 if the first potency is omitted.

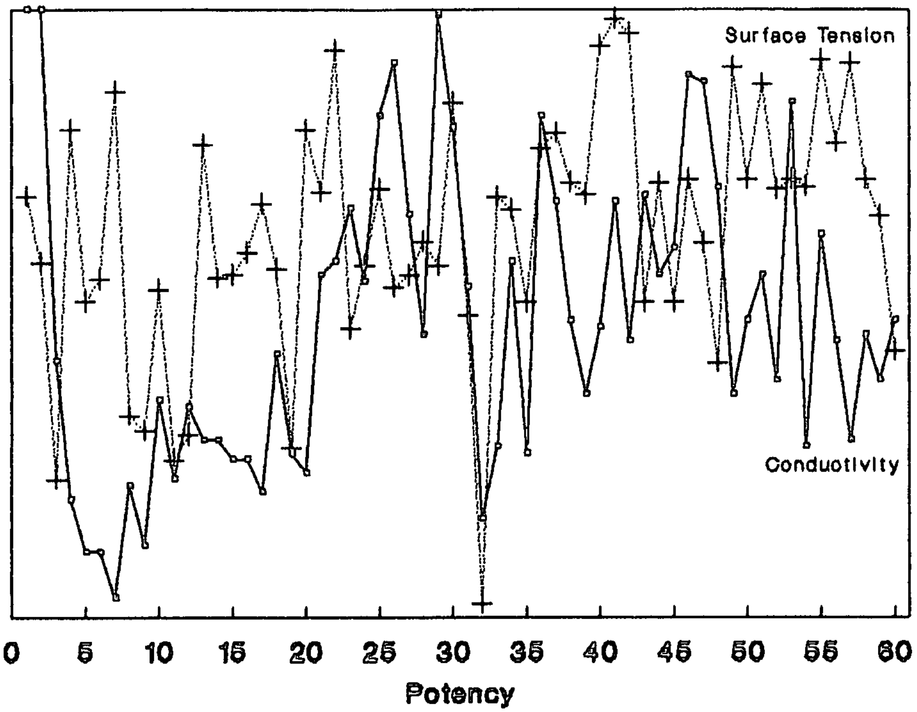

Fig 4.41 Comparison of Conductivity and Surface Tension of DH Potencies

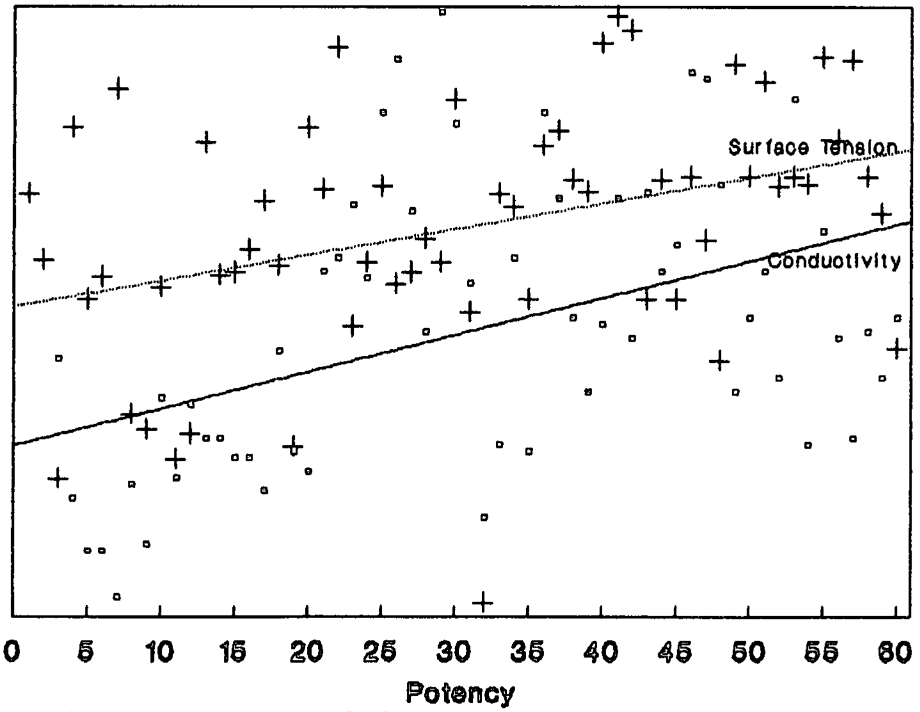

Fig 4.42 Comparison of Conductivity and Surface Tension of DH Potencies

4.4.3. THE 50-MILLESIMAL SCALE

The following graphs are the graphical representation of the results showing the relationship between the surface tension and the electrical conductivity of LM (50-millesimal) potencies.

Fig. 4.43 the results are displayed in the form of straight line graphs, and in Fig. 4.44 as trends. In Fig. 4.43 the correlation between the two graphs can be seen. It is interesting to note that the correlation between the two graphs is very close throughout, although their trends (Fig. 4.44) are quite different, the trend of the conductivity experiment being nearly flat.

The correlation coefficient (r) between the two sets of data is 0.1987.

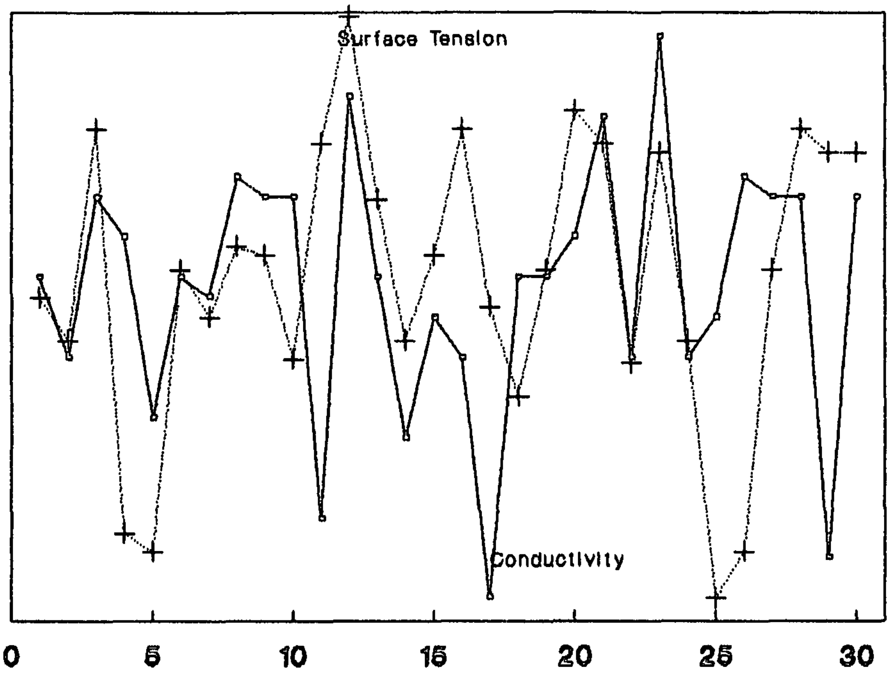

Fig 4.43 Comparison of Conductivity and Surface Tension of LM Potencies

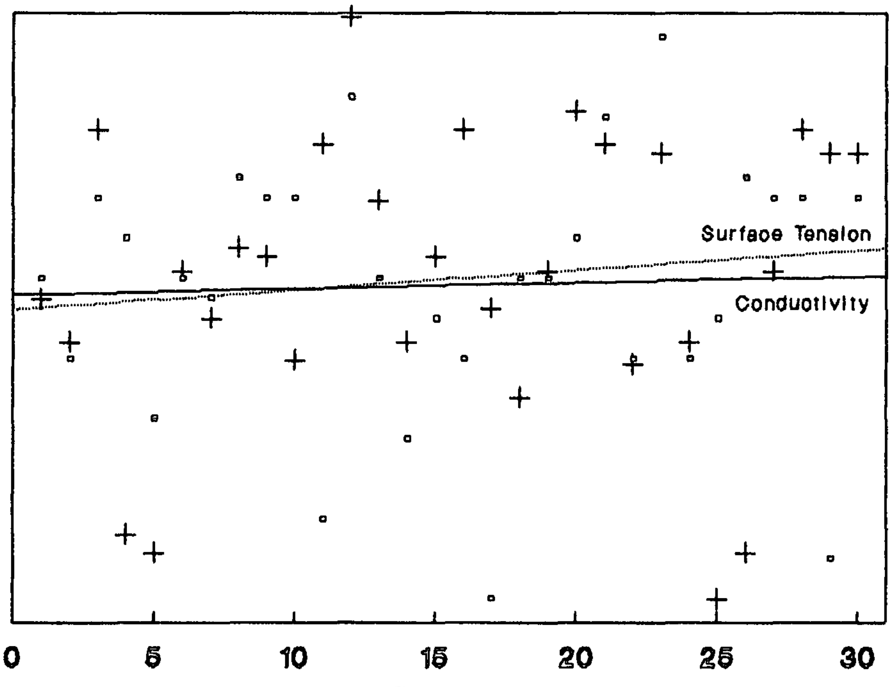

Fig 4.44 Comparison of Conductivity and Surface Tension of LM Potencies

4.4.4. THE KORSAKOVIAN SCALE

The following graphs are the graphical representation of the results showing the relationship between the surface tension and the electrical conductivity of Korsakovian potencies.

Figs. 4.45 (set one) and 4.47 (set two) display the results in the form of straight line graphs, and in Figs. 4.46 (set one) and 4.48 (set two) as trends. Very little correlation can be seen anywhere, with the exception of Fig. 4.46 where both graphs have a downward trend.

The correlation coefficients (r) between the sets of data are 0.0808 for set one, and 0.0105 for set two.

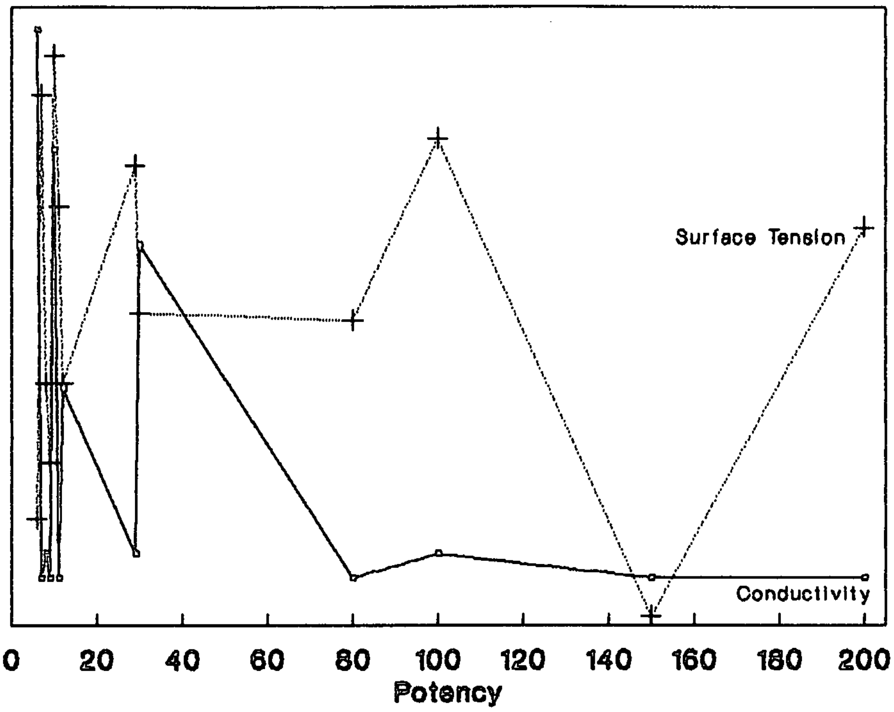

Fig 4.46 Comparison of Conduction and Surface Tension of K potencies (set one)

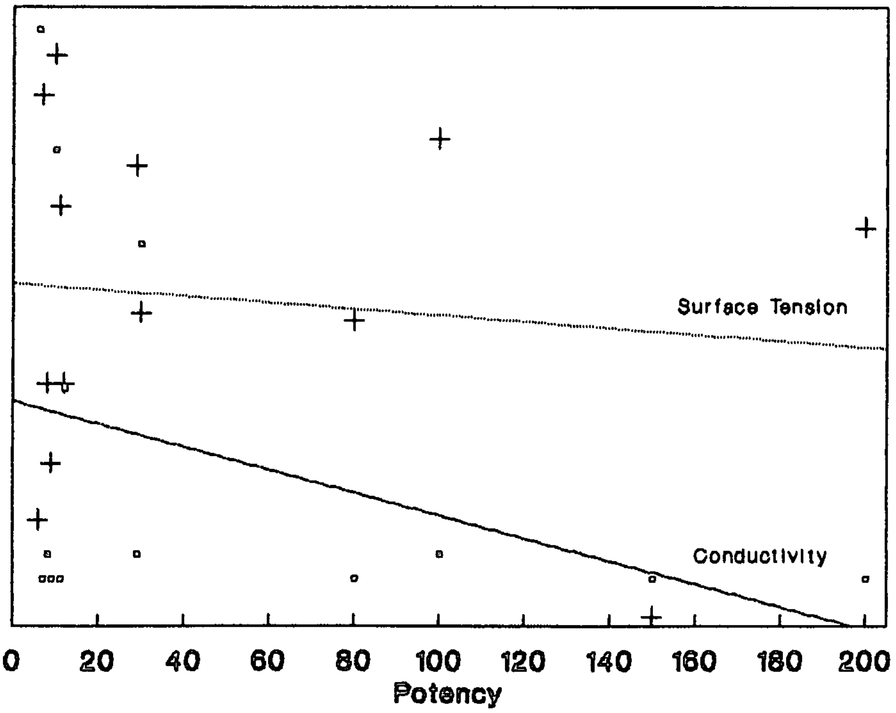

Fig 4.46 Comparison of Conduction and Surface Tension of K potencies (set one)

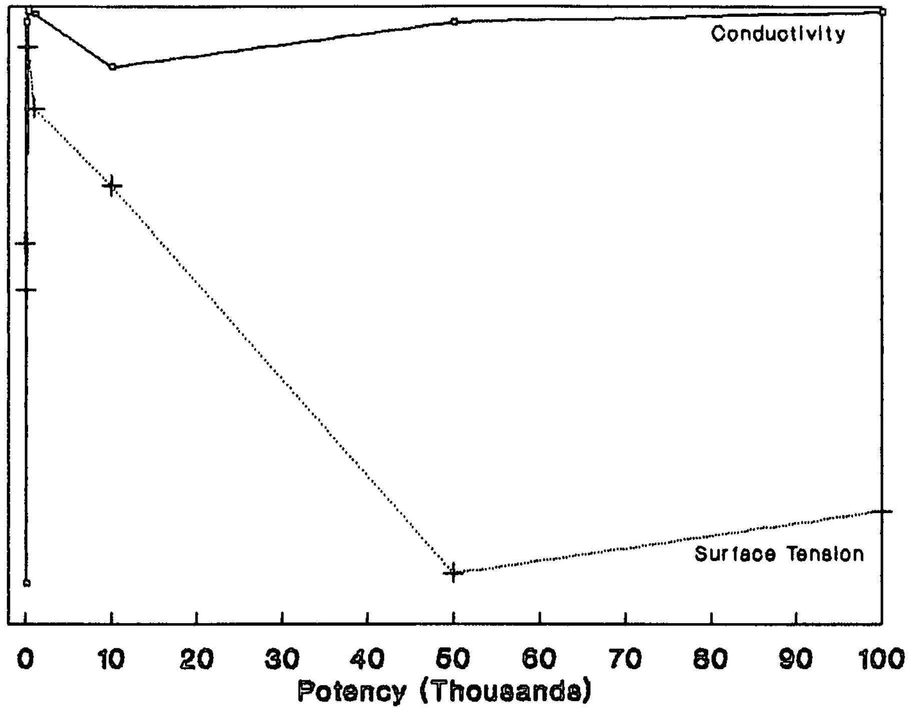

Fig 4.47 Comparison of Conduction and Surface Tension of K Potencies (set two)

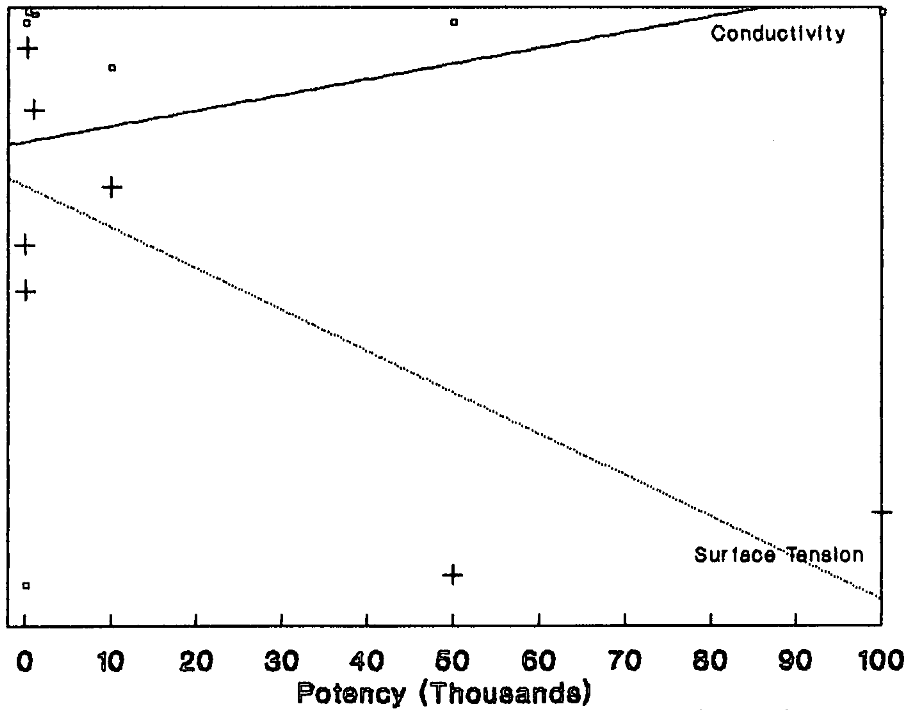

Fig 4.48 Comparison of Conduction and Surface Tension of K Potencies (set two)

4.5. POTENCIES USED IN PRACTICE

The following tables and graphs are the graphic representation of the results obtained from the questionnaires for the determination of which potencies are commonly used by Homoeopaths.

In Table 4.1 the results from the questionnaire are given, and these results are graphically represented in Figures 4.49 to 4.52. In these graphs the frequency distribution of the use of the potencies (CH, DH, LM and K scales respectively) are represented in the form of bar graphs. The most favourite potencies of each potency scale are: 30 CH, 6 DH, LM 2 and 200 K.

Table 4.2 shows the potency scales most often used and the percentage questionnaires returned (47%). Fig. 4.53 display this data graphically. Most Homoeopaths use the CH scale, with the K scale second. The LM scale is the least used.

TABLE 4.1. Frequency of use of potencies

CH		DH		LM		K	
potency	number	potency	number	potency	number	potency	number
1	1	1	1	2	4	30	8
2	1	2	1	3	2	100	1
3	7	3	9	4	2	200	22
4	3	4	3	8	2	1 000	16
5	12	5	2	10	2	2 000	1
6	15	6	16	12	2	10 000	15
7	6	7	1	15	1	50 000	7
9	18	8	2	18	1	100 000	8
10	1	9	1	30	2		
12	11	12	6				
15	17	30	9				
30	46						
200	16						
1000	4						
10000	2						

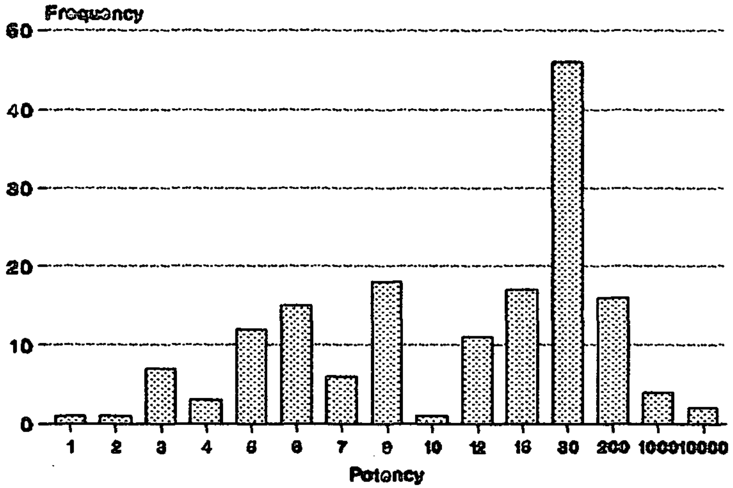

Fig 4.49 The Frequency of use of Specific CH Potencies

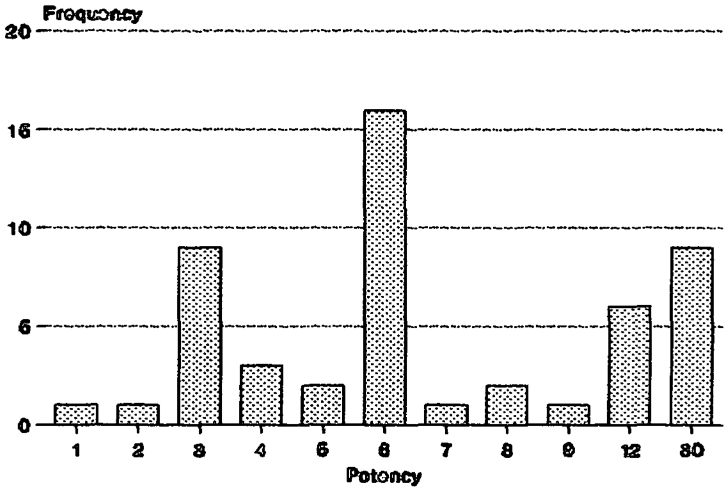

Fig 4.50 The Frequency of use of Specific DH Potencies

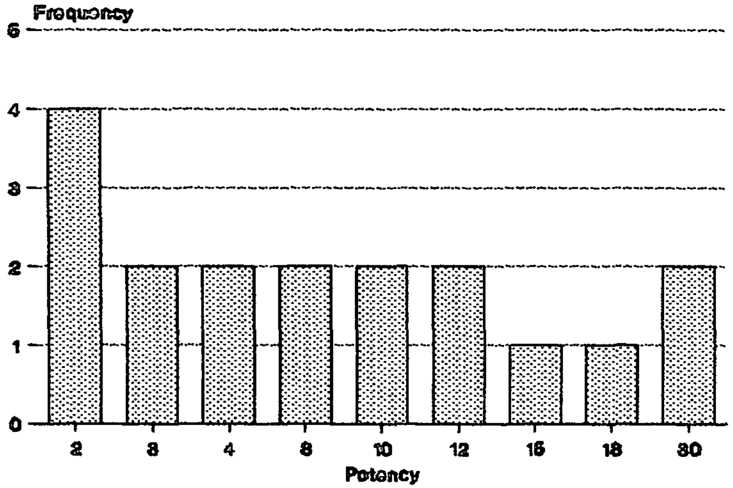

Fig 4.51 The Frequency of use of Specific LM Potencies

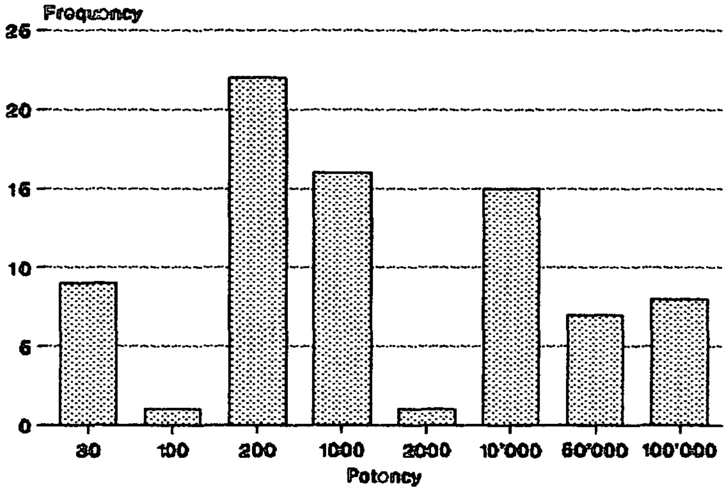

Fig 4.52 The Frequency of use of Specific K Potencies

TABLE 4.2. Frequency of use of potency scales

	Number	%
CH Scale	61	84.72
DH Scale	23	31.94
LM Scale	6	8.33
K Scale	28	38.89
Total (153)	72	47.06

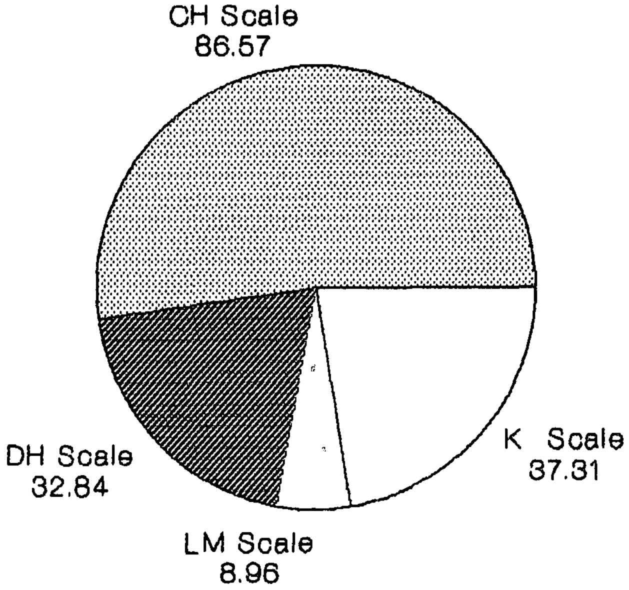

Fig 4.53 The Frequency of use of Various Potency Scales

4.6. SUMMARY

This chapter contains the graphical representation of the results from the surface tension (Appendix B) and electroconductivity (Appendix C) experiments, as well as the results from the questionnaire that was sent out.

The explanation and discussion of these results are to be found in the next chapter.

Chapter 5

5. DISCUSSION OF THE RESULTS

In the following chapter the graphs and data represented in Chapter Four are discussed. For this frequent reference is made to these graphs, but some are also reprinted or adapted to make understanding and explaining them easier.

5.1. THE SURFACE TENSION OF POTENCIES.

In discussing the surface tension of the potencies, reference will be made to the relevant graphs as in section 4.2.

It was hypothesized that the surface tension of the various potencies would differ from one another. This hypothesis holds if the graphs applicable to this subproblem are studied (Figures 4.1 to 4.17). Sinusoidal graphs can be seen for all the potency scales.

Figures 4.1 to 4.10 present the individual potency scales. It is interesting to note that the trends for the CH, DH and LM scale are all slanting upwards, while the trends for the K potencies slant downwards. This was possibly (probably) due to the small amount of K potencies used in this study, and that more reliable results would be obtained if more potencies are used. (Only a limited variety of K potencies are commercially available). Due to this the results obtained for the K potency scales have very limited value, and for this reason the K scale has been omitted in most of the cross comparisons with other potencies and potency scales.

It is important to note that the range for the CH scale is 1.36 mm, for the DH scale 2.4 mm, and for the LM scale 1.24 mm. (The ratio CH:DH is 1 : 1.76, LM:DH is 1 : 1.94, and CH:LM is 1 : 0.91) The DH scale covers a much larger range of surface tensions than any of the other scales. The probable reason for this larger range is that the deconcentration (1/10) is not as fast as is with the CH (1/100) or the LM (1/50000) scale, but faster than the K (1/?) scale. The DH scale also receives more succussions than the CH and K scale (twice as much) and much more than the LM scale (four times more). It would thus seem that the slower deconcentration and the increased number of succussions provide a much more complete potentization in the DH scale than in any of the other potency scales.

Figures 4.11 to 4.15 show the various potencies in relation to the concentration of tincture present (Mathematically calculated). It is very interesting to note that the curves of the CH and DH scales are very similar in various aspects, although some differences do exist. This can be seen in Fig. 5.1.

Note the similar wave pattern for the first half of the graph, and then the two waves move in opposite directions, to rejoin at 10^{-40} to 10^{-54}, before ending in opposite directions. This is an indication of the effect of the concentration of Pulsatilla on the physical properties of potencies. As can be seen in Fig. 4.15 the LM potency scale does not have as great fluctuations as either the CH or DH scales. This is due to the fast and extreme dilution of the potencies on the one hand, and secondly the fact that the liquid contains a large amount of lactose in relation to tincture present. This effect is due to the manufacturing process, and might have influenced the readings adversely. This was a problem seen particularly in the

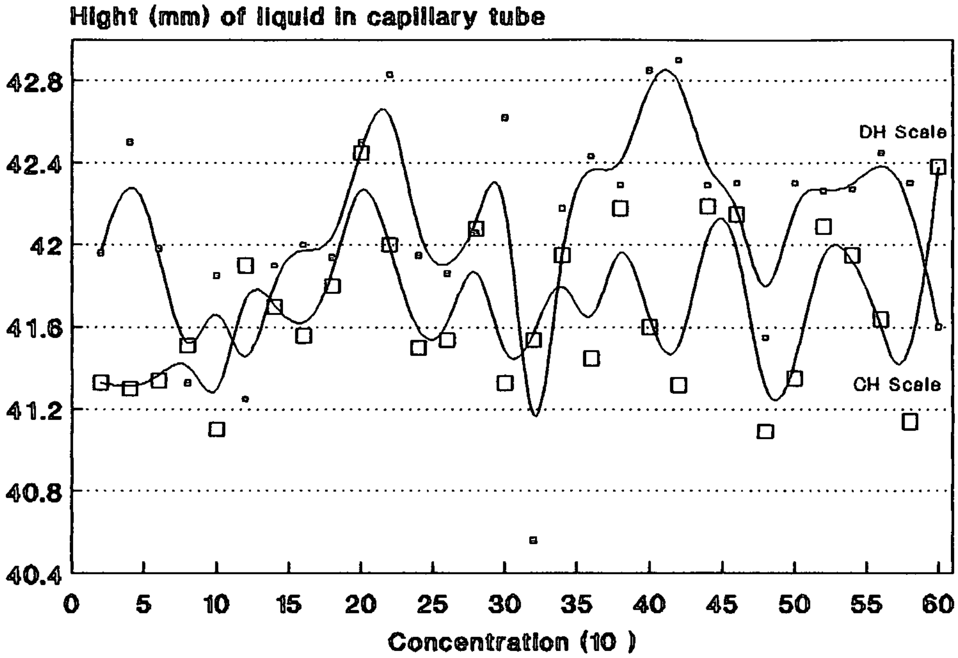

Fig 6.1. The rise (in mm) of potencies in a capillary tube with reference to their concentrations

conductivity measurements. According to this graph (Fig. 4.15) there is very little similarity between either the CH and LM or DH and LM potency scales if compared in relation to their concentration.

Looking at the number of succussions applied to the potencies (Table D.2 and Figures 4.16 and 4.17) it is interesting to note that although some striking similarities occur between some of these graphs, they are much more different from each other than when the concentrations were compared. With special reference to this it can thus be said that the concentration of tincture is very important, and that the function and the strength of the potency is not only determined by the number of succussions, as was suggested by Jenichen (Frazer, 1993).

Looking at the correlation coefficients (r) as given on p 37, it can be observed that there is statistically very little correlation between any of the potency scales. This, however, is understandable as the formula for calculating r does not allow for all the variables that were present.

5.2. THE ELECTRICAL CONDUCTIVITY OF POTENCIES

The following Section will refer to the relevant graphs as in section 4.3.

The hypothesis was that the electroconductivity of the various potencies would differ from one another. This hypothesis is true if the graphs relevant to this section are studied (Figures 4.18 to 4.38), as sinusoidal graphs can be seen for all the potency scales. It should be noted that in some of the graphs the first one or two potencies were omitted due to the high readings obtained (which in turn is due to the large amount of tincture present in them), which made a closer study of the graphs difficult. They were not omitted from any statistical calculations, except if stated otherwise.

The ranges for the various potency scales are similar to those results obtained for the surface tension experiment. The first potency's readings were omitted in calculating the following ranges. The values in brackets are those of the surface tension experiments. The range for the CH scale is 14.75 mS (1.36 mm), for the DH scale 22 mS (2.4 mm), and for the LM scale 7 mS (1.24 mm). The ratio's between the ranges of the various potency scales are as follows: CH:DH = 1 : 1.49 (1 : 1.76), LM:DH = 1 : 3.14 (1 : 1.94), and CH:LM = 1 : 0.47 (1 : 0.91). The CH:DH ratio is very similar, but the other two are markedly different. This is due to the very small range found within the LM potency scale, which, in turn, is due to the amount of lactose present in the potencies from the manufacturing process.

The results as presented in Figures 4.18 to 4.29 represent the individual potency scales. As is the case with the surface tension experiments, sinusoidal graphs can be seen. The trends for the CH and DH scales are all slanting upwards, the trend for the LM potencies is slightly downwards, while the trend for the K potencies (set one) slant downwards, and for set two upwards. Once again the K scale has been omitted in most of the cross comparisons with other potencies and potency scales, for the same reasons stated earlier.

Figures 4.30 to 4.38 show the various potencies in relation to the concentration of tincture present. Note the similarities between the DH and CH scales. This can be seen particularly well in Fig. 4.33. Their trends are also nearly identical (Fig. 4.34). There is very little similarity between the LM scale and any of the other two potency scales (Fig. 4.35), as the LM scales' real readings were concealed by the large amount of lactose present in the potencies. As mentioned before, this is due to the manufacturing process.

When the number of succussions applied to the potencies (Table D.4 and Figures 4.36 to 4.38) are considered, it can be seen that there are some similarities between the CH and the DH scales, the LM scale being the odd one out again. The trends of the DH and CH scales also slant upwards, whereas the LM scale's trend is nearly flat. The strength of the similarities seen between the CH and DH scales is supported further by the correlation coefficient between these two scales (r= 0.931).

These results support the results obtained from the surface tension experiments, showing the closer affinity the CH and DH scales have with each other, and the difference between these two scales and the

LM scale. Once again it can be stated that neither the succussion, nor the dilution can be said to be solely responsible for any particular potency's physical properties or action. Rather, it can be said that they both play an equal and inseparable part in the formation of a potency.

5.3. COMPARISON OF SURFACE TENSION AND ELECTRO-CONDUCTIVITY WITH RELATION TO SPECIFIC POTENCY SCALES.

In the following sections the two experimental methods (surface tension and electroconductivity) are discussed and compared with reference to a particular potency scale. The relevant graphs are Figures 4.39 to 4.48.

5.3.1. THE CENTESIMAL HAHNEMANNIAN SCALE

Although there are some very striking similarities between the results of the two experimental methods (Fig. 4.39), especially around the 10th potency, the differences are just as many. The correlation coefficients (r) (-0.1423 if all the readings are used, and 0.0566 if the first potency is omitted) also suggest that there is statistically little correlation between the two methods. This is interesting, because it could have been considered that the results would have shown much closer affinity to each other. It would thus seem that surface tension and electrical conductivity are not necessarily related to each other. The changes measured also do not happen at the same speed, as is confirmed by the variation in the trends (Fig. 4.40).

The comparison of the graphs to the potencies most often used in practice are found and discussed in Section 5.4.1.

5.3.2. THE DECIMAL HAHNEMANNIAN SCALE

When the results of the surface tension and the electroconductivity experiments done on the DH scale are compared (Figs. 4.41 and 4.42), differences and similarities can be observed as was the case with the CH scale. A clearer pattern of changes can be seen, probably due to the larger number of readings obtained. In the graphs alternating "periods" of difference and similarity (eg. at the 9th-11th, 30th-37th, and 54th-56th potencies) can be seen.

The correlation coefficient (r) is 0.0640 if all the potencies are used, and 0.1767 if the first two readings are omitted. This shows statistically that the correlation between the two sets of results is very small, as was the case with the CH scale.

The comparison and discussion of these results for the potencies most often used are found in Section 5.4.2.

5.3.3. THE 50-MILLESIMAL SCALE

Observation of Figs. 4.43 and 4.44 comparing the results of the surface tension and electroconductivity experiments of the LM scale, it can be observed that the two graphs are very similar in appearance. This similarity could be due to the very high dilution of the tincture, which would influence the readings more drastically, or on a more negative note, it could mean that the amount of lactose present in the potencies concealed the real effect of the potentization process. Although the graphs are very similar in appearance the correlation coefficient (r = 0.1987) suggests that there is no statistically important correlation between these two sets of data. Their trends are also completely different.

In Section 5.4.3. the comparison and discussion of the LM potencies most used in practice are found.

5.3.4. THE KORSAKOVIAN SCALE

The relevant graphs are Figures 4.45 to 4.48. Very little correlation can be seen, as is further supported by the correlation coefficients which are both close to zero (r = 0.0809 for set one and r = 0.0105 for set two).

5.4. POTENCIES USED IN PRACTICE

As could be expected the CH scale is the most frequently used potency scale. It is not only used by the most practitioners (84.7%), but the most frequently used potency (30 CH) also belongs to this scale. One can give many reasons why the CH scale is so widely used. Firstly it was the original way of preparing potencies, as developed and described by Hahnemann. The CH scale is also easy and (relatively) fast to prepare, and no special or expensive equipment is needed. Both the LM and K potency scales can be very time consuming, and K potencies are preferably manufactured by machine. Furthermore, the massive amounts of liquid used and wasted in preparing the K potencies, and the laborious way of preparing LM potencies, make them very unattractive for commercial production. The CH scale also has world wide acceptance, which is not the case with some of the other potency scales. (For example: Korsakovian potencies are not allowed in France, with the exception of one particular product, which is only available in a 200 K).

The second most used potency scale is the K scale. The wide use of this scale can be attributed to the idea that the dilutions are very

high, which is not true, considering the experiments done with radioactive Potassium bromide (Fig. 2.3). The idea that these potencies are the same as CH potencies is also held by some practitioners (See also section 5.4.1).
As can be deducted from all the negatives against the LM scale, it came last in the race of frequently used potency scales. This method was the last devised by Hahnemann, and he even preferred it to the other potency scales, but the headway the CH potency scale had, and the extremely laborious and tedious preparation of the LM potencies, the (short term) expense of buying these potencies, and the complicated way of using them compared to other potency scales, make them difficult to obtain, unattractive to use and prescribe, and unjustly neglected by most practitioners.

The next four subsections deal with each of the potency scales in particular.

5.4.1. THE CENTESIMAL HAHNEMANNIAN SCALE

As could be expected the traditionally used potencies came up tops, that is 30, 9, and 15 CH. The 200 th and 6th potencies were next in line of those most frequently used.
CH potencies up to the 200 CH were not used and thus no comparison of it's physical properties was possible, and with reference to those practitioners that noted they are using the 10'000 th CH potency, the following applies: Unfortunately some companies market potencies as being "CH" potencies, while they are actually Korsakovian or other potencies. This adds some confusion to Homoeopathic preparations. Although the results were entered as they have marked it, it is not believed that these are actually real CH potencies. The reason for

this is that for potencies to be labelled "CH" the exact process for manufacturing CH potencies is to be followed (see section 2.2.1. for details). If one is skilled in succussion and the transfer of the liquid, the time span in preparing one potency is at least four minutes. This would mean that to prepare the 10'000 th CH potency of one of the many medicines available in Homoeopathy, it would take approximately 83 working (8 hour) days, 10'000 bottles, and at least 20 litres of wasted vehicle (alcohol/water). This would make it most uneconomical to produce. Quite often some of the steps are skipped, or taken over by machine, the same bottle is used, supersuccussion or superdilution is applied, or both. So what start off as CH potencies, end up as some mongrelized, undefinable and unreliable potency labelled "CH". These are then incorrectly sold as genuine CH potencies, fooling many unsuspecting practitioners. It is suggested that practitioners look thoroughly into the techniques each company follows in preparing their potencies before they buy anything from them.

If the graphs (Fig. 4.39 and Fig. 4.40) are studied with relation to the potencies most used, it can be noticed that the two most frequently used potencies (30 CH and 9 CH) are found where there is close affinity between the graphs, but the next two most often used potencies (6 CH and 15 CH) are found where the graphs are very dissimilar. From this it can be seen that it would be very difficult to be able to suggest which potencies are medicinally most active, and it is suggested that more research is needed in this direction.

5.4.2. THE DECIMAL HAHNEMANNIAN SCALE

The lower DH potencies are used much more frequently than the higher potencies. All of the first nine potencies are used, while only the 12th and the 30th potency is used thereafter.

This would suggest that practitioners would rather use the DH scale for the lower potencies, and the CH and K scales for the higher potencies.

The four most frequently used potencies are firstly 6 DH, then secondly 3 DH and 30 DH, and fourthly 12 DH.

As was the case with the CH scale, no definite pattern between use and physical properties can be found, and recommendations as to which potencies to use are impossible.

5.4.3. THE 50-MILLESIMAL SCALE

Very few practitioners use the LM scale (8,96%). This means that the amount of data received is insufficient to be able to make an objective conclusion. Only the second potency seems to be used more often than any other, with four out of six practitioners using it. On the relevant graph (Fig. 4.43) a close correlation of the two experimental methods can be seen at this point, but no conclusions can be reached on the basis of one reading.

The results obtained with respect of this particular potency scale seem to be in line with the prediction of Majerus (1991) that the LM potencies are not suitable for scientific research.

5.4.4. THE KORSAKOVIAN SCALE

The higher Korsakovian potencies are fairly widespread in use. The 200 K is the favourite potency, with a 78,6 % use.

Unfortunately the few readings obtained experimentally are not sufficient to be able to make any observations between the physical properties and the use of the potencies.

5.5. SUMMARY

This chapter dealt with the interpretation and discussion of the results from the previous chapter, that is the surface tension and electroconductivity experiments, as well as the results from the questionnaire that was sent out to the practitioners.

Chapter 6

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

The following conclusions can be reached:

* There are definite differences between potencies and potency scales with regard to their physical properties.
* These differences can be measured and represent sinusoidal graphs when plotted graphically.
* No clear cut similarities could be found between potencies used and their physical properties.
* The potency scales closest to each other are the CH and DH scales. Little resemblance between either the LM scale or the K scale with any other potency scales could be found.
* Neither succussion nor dilution can be said to be the sole factor responsible for the properties of any one potency. Rather it is the consecutive dilution and succussion that give rise to the specific properties and action of any one potency.

6.2. RECOMMENDATIONS

The following recommendations can be made:

* Further and extended study into the properties of the CH and DH potencies is necessary in order to be able to explain the role of succussion and dilution in the potentization process.

- A cross comparison study between physical properties of various medicines might prove useful.
- If the LM scale is used for further study other methods of determining their physical properties should be used, as the methods used proved to be too insensitive.
- If Korsakovian potencies are to be used a much larger variety is needed.

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Appendix A

QUESTIONNAIRE TO PRACTITIONERS

On the next pages an example of the letter and postcard sent to the practitioners is reproduced.

(AFRIKAANS OMMESY)

DEPARTMENT OF HOMOEOPATHY

TECHNIKON NATAL

P.O. BOX 953

DURBAN

4001

7 November 1994

Dear doctor

I am currently conducting research at the Technikon Natal and would appreciate it if you could help me. Please complete the following questionnaire by marking the relevant blocks on the attached postcard and post it back to me as soon as possible.

The question relates to which potencies of Pulsatilla you use on a regular basis in your practice. This information will be used to determine whether the potencies commonly used by practitioners correspond to those found most active in laboratory investigations.

Thank you for your time, effort and help.

Yours sincerely

C.J. (TIAAN) VAN SCHALKWYK

(ENGLISH OVERLEAF)

DEPARTEMENT VAN HOMEOPATIE

TECHNIKON NATAL

POSBUS 953

DURBAN

4001

7 November 1994

Beste Dokter

Ek is tans besig met navorsing by Technikon Natal en sal dit waardeer indien u my sal help. Sal u asseblief die toepaslike blokkies op die ingeslote poskaart merk en dit spoedig aan my terug pos.

Die vraag hou verband met watter potensies van Pulsatilla u gereeld in u praktyk gebruik. Die informasie sal gebruik word om te sien of die potensies wat algemeen in die praktyk gebruik word ooreenstem met die potensies wat in die laboratorium mees aktief blyk te wees.

By voorbaat baie dankie vir u hulp en tyd

C.J. (TIAAN) VAN SCHALKWYK

Ref no.......

Stamp

MR C.J. VAN SCHALKWYK
DEPARTMENT OF HOMOEOPATHY
TECHNIKON NATAL
P.O. BOX 953
DURBAN
4001

Please mark the appropriate boxes: Which potencies of Pulsatilla do you use?
Merk asseblief die blokkies: Watter potensies van Pulsatilla gebruik u?

POTENCY SCALE	CH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	DH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
		46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	LM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	K	30	50	100	200	300	400	500								
		600	700	800	900	1000	2000	3000								
		4000	5000	6000	7000	8000	9000	10'000								
		20'000	30'000	40'000	50'000	60'000	70'000	80'000								
	OTHER/ANDER:						90'000	100 M								

Appendix B

RESULTS OF SURFACE TENSION EXPERIMENTS

TABLE B.1. The rise (in mm) of CH Pulsatilla potencies in a capillary tube.

no	R1	R2	R3	R4	R5	Range	Sx	Mean
1	41.35	41.30	41.30	41.35	41.35	0.05	0.027386	41.33
2	41.30	41.30	41.30	41.30	41.30	0.00	0.00	41.30
3	41.35	41.35	41.30	41.35	41.35	0.05	0.022361	41.34
4	41.50	41.50	41.50	41.50	41.55	0.05	0.022361	41.51
5	41.10	41.10	41.10	41.10	41.10	0.00	0.00	41.10
6	41.90	41.90	41.90	41.90	41.90	0.00	0.00	41.90
7	41.70	41.70	41.70	41.70	41.70	0.00	0.00	41.70
8	41.55	41.55	41.55	41.55	41.60	0.05	0.022361	41.56
9	41.80	41.80	41.80	41.80	41.80	0.00	0.00	41.80
10	42.45	42.45	42.45	42.45	42.45	0.00	0.00	42.45
11	42.00	42.00	42.00	42.00	42.00	0.00	0.00	42.00
12	41.50	41.50	41.50	41.50	41.50	0.00	0.00	41.50
13	41.55	41.50	41.55	41.55	41.55	0.05	0.022361	41.54
14	42.10	42.10	42.00	42.10	42.10	0.10	0.044721	42.08
15	41.30	41.35	41.35	41.30	41.35	0.05	0.027386	41.33
16	41.55	41.55	41.55	41.50	41.55	0.05	0.022361	41.54
17	41.95	41.95	41.95	41.95	41.95	0.00	0.00	41.95
18	41.45	41.45	41.45	41.45	41.45	0.00	0.00	41.45
19	42.20	42.20	42.15	42.20	42.15	0.05	0.027386	42.18
20	41.60	41.50	41.60	41.60	41.70	0.20	0.070711	41.60
21	41.35	41.35	41.35	41.25	41.30	0.05	0.044721	41.32
22	42.20	42.15	42.20	42.20	42.20	0.05	0.022361	42.19
23	42.15	42.15	42.15	42.15	42.15	0.00	0.00	42.15
24	41.10	41.10	41.05	41.10	41.10	0.05	0.022361	41.09
25	41.35	41.35	41.35	41.35	41.35	0.00	0.00	41.35
26	42.10	42.10	42.10	42.10	42.05	0.05	0.022361	42.09
27	41.95	41.95	41.95	41.95	41.95	0.00	0.00	41.95
28	41.65	41.65	41.65	41.65	41.60	0.05	0.022361	41.64
29	41.15	41.15	41.15	41.10	41.15	0.05	0.022361	41.14
30	42.40	42.35	42.40	42.40	42.35	0.05	0.027386	42.38
Average						0.035	0.0164436	41.68

TABLE B.2. The rise (in mm) of DH Pulsatilla potencies in a capillary tube.

no	R1	R2	R3	R4	R5	Range	Sx	Mean
1	42.25	42.25	42.25	42.25	42.15	0.10	0.044721	42.23
2	41.95	41.95	41.95	42.00	41.95	0.05	0.022361	41.96
3	41.10	41.05	41.05	41.10	41.05	0.05	0.027386	41.07
4	42.50	42.50	42.50	42.50	42.50	0.00	0.00	42.50
5	41.80	41.80	41.80	41.80	41.80	0.00	0.00	41.80
6	41.90	41.90	41.90	41.85	41.90	0.05	0.022361	41.89
7	42.65	42.65	42.70	42.65	42.65	0.05	0.022361	42.66
8	41.35	41.30	41.30	41.35	41.35	0.05	0.027386	41.33
9	41.25	41.35	41.25	41.25	41.25	0.10	0.058138	41.27
10	41.90	41.80	41.90	41.80	41.85	0.10	0.050	41.85
11	41.15	41.15	41.15	41.15	41.15	0.00	0.00	41.15
12	41.25	41.25	41.25	41.25	41.25	0.00	0.00	41.25
13	42.45	42.45	42.45	42.45	42.40	0.05	0.022361	42.44
14	41.90	41.90	41.90	41.90	41.90	0.00	0.00	41.90
15	41.95	41.90	41.90	41.90	41.90	0.05	0.022361	41.91
16	42.00	42.00	42.00	42.00	42.00	0.00	0.00	42.00
17	42.20	42.20	42.20	42.20	42.20	0.00	0.00	42.20
18	41.95	41.95	41.90	41.95	41.95	0.05	0.022361	41.94
19	41.20	41.20	41.20	41.20	41.20	0.00	0.00	41.20
20	42.50	42.50	42.50	42.50	42.50	0.00	0.00	42.50
21	42.25	42.25	42.25	42.25	42.25	0.00	0.00	42.25
22	42.85	42.80	42.80	42.85	42.85	0.05	0.027386	42.83
23	41.70	41.65	41.70	41.70	41.70	0.05	0.022361	41.69
24	41.95	41.95	41.95	41.95	41.95	0.00	0.00	41.95
25	42.20	42.25	42.25	42.30	42.30	0.10	0.041833	42.26
26	41.85	41.85	41.90	41.85	41.85	0.05	0.022361	41.86
27	41.90	41.90	41.90	41.95	41.90	0.05	0.022361	41.91
28	42.05	42.05	42.05	42.05	42.05	0.00	0.00	42.05
29	41.95	41.95	41.95	41.95	41.95	0.00	0.00	41.95
30	42.65	42.60	42.60	42.65	42.60	0.05	0.027386	42.62

no	R1	R2	R3	R4	R5	Range	Sx	Mean
31	41.75	41.75	41.75	41.75	41.75	0.00	0.00	41.75
32	40.55	40.60	40.55	40.55	40.55	0.05	0.022361	40.56
33	42.20	42.20	42.25	42.25	42.25	0.05	0.027386	42.23
34	42.20	42.15	42.15	42.20	42.20	0.05	0.027386	42.18
35	41.80	41.80	41.80	41.80	41.80	0.00	0.00	41.80
36	42.45	42.40	42.45	42.45	42.40	0.05	0.027386	42.43
37	42.45	42.50	42.50	42.50	42.50	0.05	0.022361	42.49
38	42.30	42.25	42.30	42.30	42.30	0.05	0.022361	42.29
39	42.25	42.25	42.25	42.20	42.25	0.05	0.022361	42.24
40	42.85	42.85	42.85	42.85	42.85	0.00	0.00	42.85
41	42.95	42.95	43.00	42.95	42.95	0.05	0.022361	42.96
42	42.90	42.90	42.90	42.90	42.90	0.00	0.00	42.90
43	41.80	41.80	41.80	41.80	41.80	0.00	0.00	41.80
44	42.30	42.25	42.30	42.30	42.30	0.05	0.022361	42.29
45	41.80	41.80	41.80	41.80	41.80	0.00	0.00	41.80
46	42.30	42.30	42.30	42.30	42.30	0.00	0.00	42.30
47	42.00	42.05	42.05	42.05	42.05	0.05	0.022361	42.04
48	41.55	41.55	41.55	41.55	41.55	0.00	0.00	41.55
49	42.75	42.80	42.75	42.75	42.75	0.05	0.022361	42.76
50	42.30	42.30	42.30	42.30	42.30	0.00	0.00	42.30
51	42.70	42.65	42.70	42.70	42.70	0.05	0.022361	42.69
52	42.25	42.30	42.25	42.25	42.25	0.05	0.022361	42.26
53	42.30	42.30	42.30	42.30	42.30	0.00	0.00	42.30
54	42.25	42.25	42.30	42.25	42.30	0.05	0.027386	42.27
55	42.80	42.80	42.80	42.80	42.75	0.05	0.022361	42.79
56	42.45	42.45	42.45	42.45	42.45	0.00	0.00	42.45
57	42.80	42.75	42.75	42.80	42.80	0.05	0.027386	42.78
58	42.30	42.30	42.30	42.30	42.30	0.00	0.00	42.30
59	42.15	42.15	42.15	42.15	42.15	0.00	0.00	42.15
60	41.60	41.60	41.60	41.60	41.60	0.00	0.00	41.60
Average						0.031	0.0146667	42.09

TABLE B.3. The rise (in mm) of LM Pulsatilla potencies in a capillary tube.

no	R1	R2	R3	R4	R5	Range	Sx	Mean
1	41.40	41.35	41.40	41.40	41.40	0.05	0.022361	41.39
2	41.30	41.30	41.30	41.30	41.30	0.00	0.00	41.30
3	41.75	41.75	41.75	41.75	41.75	0.00	0.00	41.75
4	40.90	40.90	40.90	40.90	40.85	0.05	0.022361	40.89
5	40.85	40.85	40.85	40.85	40.85	0.00	0.00	40.85
6	41.45	41.45	41.45	41.45	41.45	0.00	0.00	41.45
7	41.35	41.35	41.35	41.35	41.35	0.00	0.00	41.35
8	41.50	41.50	41.50	41.50	41.50	0.00	0.00	41.50
9	41.45	41.45	41.50	41.50	41.50	0.05	0.027386	41.48
10	41.25	41.25	41.25	41.25	41.30	0.05	0.022361	41.26
11	41.70	41.75	41.75	41.70	41.70	0.05	0.027386	41.72
12	41.95	42.00	42.00	42.00	42.00	0.05	0.022361	41.99
13	41.60	41.60	41.60	41.60	41.60	0.00	0.00	41.60
14	41.30	41.30	41.30	41.30	41.30	0.00	0.00	41.30
15	41.45	41.50	41.45	41.50	41.50	0.05	0.027386	41.48
16	41.75	41.75	41.75	41.75	41.75	0.00	0.00	41.75
17	41.35	41.35	41.40	41.40	41.35	0.05	0.027386	41.37
18	41.20	41.15	41.15	41.20	41.20	0.05	0.027386	41.18
19	41.45	41.45	41.45	41.45	41.45	0.00	0.00	41.45
20	41.75	41.80	41.80	41.80	41.80	0.05	0.022361	41.79
21	41.70	41.70	41.75	41.70	41.75	0.05	0.027386	41.72
22	41.25	41.25	41.25	41.25	41.25	0.00	0.00	41.25
23	41.70	41.70	41.70	41.70	41.70	0.00	0.00	41.70
24	41.30	41.30	41.30	41.30	41.30	0.00	0.00	41.30
25	40.75	40.75	40.75	40.75	40.75	0.00	0.00	40.75
26	40.85	40.85	40.85	40.85	40.85	0.00	0.00	40.85
27	41.45	41.45	41.45	41.45	41.45	0.00	0.00	41.45
28	41.75	41.75	41.75	41.75	41.75	0.00	0.00	41.75
29	41.70	41.70	41.70	41.70	41.70	0.00	0.00	41.70
30	41.70	41.70	41.70	41.70	41.70	0.00	0.00	41.70
Average						0.1833	0.00933333	41.43

TABLE B.4. The rise (in mm) of K Pulsatilla potencies (set one) in a capillary tube.

No.	R1	R2	R3	R4	R5	Range	Sx	Mean
6	41.00	41.05	41.05	41.05	41.05	0.05	0.022361	41.04
7	42.00	42.00	42.00	42.00	42.00	0.00	0.00	42.00
8	41.35	41.35	41.35	41.35	41.35	0.00	0.00	41.35
9	41.15	41.15	41.15	41.15	41.25	0.00	0.00	41.17
10	42.10	42.05	42.10	42.10	42.10	0.05	0.022361	42.09
11	41.75	41.75	41.75	41.75	41.75	0.00	0.00	41.75
12	41.35	41.35	41.35	41.35	41.35	0.00	0.00	41.35
29	41.85	41.80	41.85	41.85	41.85	0.05	0.022361	41.84
30	41.50	41.50	41.50	41.55	41.50	0.05	0.022361	41.51
80	41.50	41.50	41.50	41.50	41.45	0.05	0.022361	41.49
100	41.90	41.90	41.90	41.90	41.90	0.00	0.00	41.90
150	40.80	40.80	40.85	40.80	40.85	0.05	0.027386	40.82
200	41.70	41.70	41.70	41.70	41.70	0.00	0.00	41.70
Average						0.023	0.010770	41.54

TABLE B.5. The rise (in mm) of K Pulsatilla potencies (set two) in a capillary tube.

No.	R1	R2	R3	R4	R5	Range	Sx	Mean
6	41.70	41.75	41.75	41.75	41.75	0.05	0.022361	41.74
30	41.65	41.65	41.65	41.65	41.65	0.00	0.00	41.65
200	42.10	42.15	42.10	42.10	42.15	0.05	0.027386	42.12
1MK	42.00	42.00	42.00	42.00	42.00	0.00	0.00	42.00
XMK	41.85	41.85	41.85	41.85	41.85	0.00	0.00	41.85
LMK	41.10	41.10	41.10	41.10	41.10	0.00	0.00	41.10
CMK	41.20	41.25	41.25	41.20	41.20	0.05	0.027386	41.22
Average						0.017	0.011019	41.67

TABLE B.6. The rise (in mm) of Pulsatilla potencies in relation to their concentration.

Concentration	DH	CH	LM
10^{-2}	41.96	41.33	
10^{-4}	42.50	41.30	
10^{-6}	41.89	41.34	
10^{-8}	41.33	41.51	
10^{-10}	**41.85**	**41.10**	**41.39**
10^{-12}	41.25	41.90	
10^{-14}	41.90	41.70	
10^{-15}	**41.91**		**41.30**
10^{-16}	42.00	**41.56**	
10^{-18}	41.94	41.80	
10^{-20}	**42.50**	**42.25**	**41.75**
10^{-22}	42.83	42.00	
10^{-24}	**41.95**	**41.50**	**40.89**
10^{-26}	41.86	41.54	
10^{-28}	42.05	42.08	
10^{-29}	**41.95**		**40.85**
10^{-30}	42.62	**41.33**	
10^{-32}	40.56	41.54	
10^{-34}	**42.18**	**41.95**	**41.45**
10^{-36}	42.43	41.45	
10^{-38}	**42.29**	**42.18**	**41.35**
10^{-40}	42.85	41.60	
10^{-42}	42.90	41.32	
10^{-43}	**41.80**		**41.50**
10^{-44}	42.29	**42.19**	
10^{-46}	42.30	42.15	
10^{-48}	**41.55**	**41.09**	**41.48**
10^{-50}	42.30	41.35	
10^{-52}	**42.26**	**42.09**	**41.26**
10^{-54}	42.27	41.95	
10^{-56}	42.45	**41.64**	
10^{-57}	**42.78**		**41.72**
10^{-58}	42.30	41.14	
10^{-60}	41.60	42.38	

(The figures in bold have been used in Fig. 4.15)

TABLE B.7. The rise (in mm) of Pulsatilla potencies in relation to the total number of succussions applied.

Sucussions	DH	CH	LM
100	42.23	41.33	
200	41.96	41.30	
300	41.07	41.34	
400	42.50	41.51	41.39
500	41.80	41.10	41.30
600	41.89	41.90	41.75
700	42.66	41.70	40.89
800	41.33	41.56	40.85
900	41.27	41.80	41.45
1000	41.85	42.45	41.35
1100	41.15	42.00	41.50
1200	41.25	41.50	41.48
1300	42.44	41.54	41.26
1400	41.90	42.08	41.72
1500	41.91	41.33	41.99
1600	42.00	41.54	41.60
1700	42.20	41.95	41.30
1800	41.94	41.45	41.48
1900	41.20	42.18	41.75
2000	42.50	41.60	41.37
2100	42.25	41.32	41.18
2200	42.83	42.19	41.45
2300	41.69	42.15	41.79
2400	41.95	41.09	41.72
2500	42.26	41.35	41.25
2600	41.86	42.09	41.70
2700	41.91	41.95	41.30
2800	42.05	41.64	40.75
2900	41.95	41.14	41.85
3000	42.62	42.38	41.45
3100	41.75		41.75
3200	40.56		41.70
3300	42.23		41.70

Appendix C

RESULTS OF ELECTROCONDUCTIVITY EXPERIMENTS

TABLE C.1. The Conductivity (in mS) of CH potencies.

no	R1	R2	R3	R4	R5	Range	Sx	Mean
1	540	570	571	573	570	3	1.414214	571.00
2	493	505	511	504	502	9	3.872983	505.50
3	489	510	511	511	495	15	7.847505	506.75
4	495	500	515	509	510	15	6.244998	508.50
5	494	509	514	510	515	6	2.943920	512.00
6	490	503	509	510	509	7	3.201562	507.75
7	495	510	511	501	510	10	4.690416	508.00
8	495	501	510	504	512	11	5.123475	506.75
9	495	513	513	513	518	5	2.500	514.25
10	502	510	520	520	520	10	5.00	517.50
11	485	503	505	504	504	2	0.816497	504.00
12	485	509	516	510	510	5	3.201562	511.25
13	470	513	514	513	519	6	2.872281	514.75
14	494	510	512	506	506	6	3.00	508.50
15	495	510	511	514	509	5	2.160247	511.00
16	485	508	515	515	514	7	3.366502	513.00
17	480	509	512	513	510	4	1.825742	511.00
18	495	520	520	515	520	5	2.500	518.75
19	485	511	511	512	512	1	0.577350	511.50
20	497	516	520	511	519	9	4.041452	516.50
21	486	506	506	509	509	3	1.732051	507.50
22	495	510	514	514	510	4	2.309401	512.00
23	480	509	511	510	510	2	0.816497	510.00
24	484	517	518	514	519	5	2.160247	517.00
25	490	508	510	510	510	2	1.00	509.50
26	496	510	515	512	510	5	2.362908	511.75
27	475	508	510	510	509	2	0.957427	509.25
28	490	514	519	516	514	5	2.362908	515.75
29	480	517	517	514	515	3	1.500	515.75
30	496	518	518	517	519	2	2.217357	518.00
Average						5.80	2.730920	513.49

TABLE C.2. The Conductivity (in mS) of DH potencies.

No	R1	R2	R3	R4	R5	Range	Sx	Mean
1	577	710	710	710	710	0	0.00	710.00
2	429	435	436	435	438	3	1.414214	436.00
3	400	407	410	408	410	3	1.500	408.75
4	357	401	404	404	405	4	1.732051	403.50
5	305	403	400	400	403	3	1.732051	401.50
6	305	403	400	403	400	3	1.723051	401.50
7	375	400	400	399	400	1	0.500	399.75
8	310	404	405	404	403	2	0.816497	404.00
9	377	400	403	402	402	3	1.258306	401.75
10	383	409	410	400	410	10	4.856267	407.25
11	400	405	405	405	404	1	0.500	404.75
12	357	405	409	409	405	4	2.309401	407.00
13	370	405	405	408	405	3	1.500	405.75
14	340	406	405	405	407	2	0.957427	405.75
15	305	404	406	404	406	2	1.154701	405.00
16	390	405	405	405	405	0	0.00	405.00
17	327	404	404	403	404	1	0.500	403.75
18	376	409	410	409	408	2	0.816497	409.00
19	388	405	405	406	405	1	0.500	405.25
20	353	404	404	405	405	1	0.577350	404.50
21	381	411	413	411	413	2	0.577350	412.00
22	353	412	413	413	412	1	0.577350	412.50
23	383	415	413	415	415	2	1.00	414.50
24	401	411	411	412	413	2	0.957427	411.75
25	305	417	418	418	419	2	0.816497	418.00
26	405	420	420	420	420	0	0.00	420.00
27	320	413	414	414	416	3	1.258306	414.25
28	400	409	410	410	410	1	0.500	409.75
29	406	421	424	424	418	7	2.872281	421.75
30	323	418	417	417	418	1	0.577350	417.50

No	R1	R2	R3	R4	R5	Range	Sx	Mean
31	399	412	412	411	411	1	0.577350	411.50
32	390	401	402	401	404	3	1.414214	402.00
33	258	406	405	405	406	1	0.577350	405.50
34	385	412	414	412	412	2	1.00	412.50
35	343	405	405	405	406	1	0.500	405.25
36	398	418	418	418	418	0	0.00	418.00
37	405	414	415	415	415	1	0.500	414.75
38	400	411	410	410	410	1	0.500	410.25
39	401	407	407	407	409	2	1.00	407.50
40	396	410	410	410	410	0	0.00	410.00
41	400	415	415	414	415	1	0.500	414.75
42	388	408	410	410	410	2	1.00	409.50
43	379	415	415	415	415	0	0.00	415.00
44	405	412	412	412	412	0	0.00	412.00
45	380	413	413	413	413	0	0.00	413.00
46	382	418	418	418	424	6	3.00	419.50
47	401	419	419	420	419	1	0.500	419.25
48	340	415	415	415	416	1	0.500	415.25
49	385	408	407	407	408	1	0.577350	407.50
50	400	411	410	410	410	1	0.500	410.25
51	400	412	412	412	412	0	0.00	412.00
52	391	408	408	408	408	0	0.00	408.00
53	408	418	418	418	420	2	1.00	418.50
54	387	405	406	406	405	1	0.577350	405.50
55	398	414	413	413	414	1	0.577350	413.50
56	380	408	410	410	410	2	1.00	409.50
57	394	406	405	405	407	2	0.957427	405.75
58	400	410	410	410	409	1	0.500	409.75
59	385	408	408	408	408	0	0.00	408.00
60	398	410	410	411	410	1	0.500	410.25
Average						1.75	0.854196	415.26

TABLE C.3. The Conductivity (in mS) of LM potencies.

No	R1	R2	R3	R4	R5	Range	Sx	Mean
1	561	569	569	569	569	0	0.00	569.00
2	552	568	568	568	568	0	0.00	568.00
3	560	570	570	570	570	0	0.00	570.00
4	564	570	569	569	570	1	0.577350	569.50
5	560	567	567	567	568	1	0.500	567.25
6	560	569	569	569	569	0	0.00	569.00
7	568	569	568	569	570	2	0.816497	569.00
8	561	570	571	570	570	1	0.500	570.25
9	561	570	570	570	570	0	0.00	570.00
10	562	570	570	570	570	0	0.00	570.00
11	554	566	566	566	566	0	0.00	566.00
12	555	571	571	572	571	1	0.500	571.25
13	560	569	569	569	569	0	0.00	569.00
14	559	567	567	567	567	0	0.00	567.00
15	562	569	569	568	568	1	0.577350	568.50
16	560	568	568	568	568	0	0.00	568.00
17	550	565	565	565	565	0	0.00	565.00
18	560	568	569	570	569	2	0.816497	569.00
19	561	569	569	569	569	0	0.00	569.00
20	563	569	570	570	569	1	0.577350	569.50
21	560	571	571	571	571	0	0.00	571.00
22	561	568	568	568	568	0	0.00	568.00
23	564	572	572	572	572	0	0.00	572.00
24	561	568	568	568	568	0	0.00	568.00
25	563	568	568	569	569	1	0.577350	568.50
26	563	571	570	570	570	1	0.500	570.25
27	560	570	570	570	570	0	0.00	570.00
28	560	570	570	570	570	0	0.00	570.00
29	559	565	566	565	566	1	0.577350	565.50
30	560	570	570	570	570	0	0.00	570.00
Average						0.43	0.217325	568.92

TABLE C.4. The Conductivity (in mS) of K potencies (set one).

No	R1	R2	R3	R4	R5	Range	Sx	Mean
6	548	535	535	535	538	3	1.500	535.75
7	530	530	530	530	530	0	0.00	530.00
8	528	531	530	530	530	1	0.500	530.25
9	530	530	530	530	530	0	0.00	530.00
10	537	534	535	535	534	1	0.577350	534.50
11	530	530	530	530	530	0	0.00	530.00
12	530	532	532	532	532	0	0.00	532.00
29	528	530	530	531	530	1	0.500	530.25
30	537	534	534	533	533	1	0.577350	533.50
80	530	530	530	530	530	0	0.00	530.00
100	530	530	531	530	530	1	0.500	530.25
150	530	530	530	530	530	0	0.00	530.00
200	532	530	532	528	530	4	1.632993	530.00
Average						0.92	0.445207	531.27

TABLE C.5. The Conductivity (in mS) of K potencies (set two).

No	R1	R2	R3	R4	R5	Range	Sx	Mean
6	534	534	534	534	534	0	0.00	534.00
30	527	533	534	534	534	1	0.500	533.75
200	532	535	535	535	535	0	0.00	535.00
MK	530	534	535	535	535	1	0.500	534.75
XMK	527	530	530	530	530	0	0.00	530.00
LMK	531	534	534	534	534	0	0.00	534.00
CMK	531	535	535	535	535	0	0.00	535.00
Average						0.28	0.1429	533.79

TABLE C.6. The Conductivity (in mS) of Pulsatilla potencies in relation to their concentration.

Concentration	DH	CH	LM
10^{-2}	436.00	571.00	
10^{-4}	403.50	505.50	
10^{-6}	401.50	506.75	
10^{-8}	404.00	508.50	
10^{-10}	**407.25**	**512.00**	**569.00**
10^{-12}	407.00	507.75	
10^{-14}	405.75	508.00	
10^{-15}	**405.00**		**568.00**
10^{-16}	405.00	**506.75**	
10^{-18}	409.00	514.25	
10^{-20}	**404.50**	**517.50**	**570.00**
10^{-22}	412.50	504.00	
10^{-24}	**411.75**	**511.25**	**569.50**
10^{-26}	420.00	514.75	
10^{-28}	409.75	508.50	
10^{-29}	**421.75**		**567.25**
10^{-30}	417.50	**511.00**	
10^{-32}	402.00	513.00	
10^{-34}	**412.50**	**511.00**	**569.00**
10^{-36}	418.00	518.75	
10^{-38}	**410.25**	**511.50**	**569.00**
10^{-40}	410.00	516.50	
10^{-42}	409.50	507.50	
10^{-43}	**415.00**		**570.25**
10^{-44}	412.00	**512.00**	
10^{-46}	419.50	510.00	
10^{-48}	**415.25**	**517.00**	**570.00**
10^{-50}	410.25	509.50	
10^{-52}	**408.00**	**511.75**	**570.00**
10^{-54}	405.50	509.25	
10^{-56}	409.50	**515.75**	
10^{-57}	**405.75**		**566.00**
10^{-58}	409.75	515.75	
10^{-60}	410.25	518.00	

(The figures in bold have been used in Fig. 4.30)

TABLE C.7. The Conductivity (in mS) of Pulsatilla potencies in relation to the total number of succussions applied.

Sucussions	DH	CH	LM
100	710.00	571.00	
200	436.00	505.50	
300	408.70	506.75	
400	403.50	508.50	569.00
500	401.50	512.00	568.00
600	401.50	507.75	570.00
700	399.75	508.00	569.50
800	404.00	506.75	567.25
900	401.75	514.25	569.00
1000	407.25	517.50	569.00
1100	404.75	504.00	570.25
1200	407.00	511.25	570.00
1300	405.75	514.75	570.00
1400	405.75	508.50	566.00
1500	405.00	511.00	571.25
1600	405.00	513.00	569.00
1700	403.75	511.00	567.00
1800	409.00	518.75	568.50
1900	405.25	511.50	568.00
2000	404.50	516.50	565.00
2100	412.00	507.50	569.00
2200	412.50	512.00	569.00
2300	414.50	510.00	569.50
2400	411.75	517.00	571.00
2500	418.00	509.50	568.00
2600	420.00	511.75	572.00
2700	414.25	509.25	568.00
2800	409.75	515.75	568.25
2900	421.75	515.75	570.25
3000	417.50	518.00	570.00
3100	411.50		570.00
3200	402.00		565.50
3300	405.50		570.00