

Research paper

Compensated model of the homeopathic repertory
version 1.0

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Abstract

One of the major problems homeopaths are faced with, when using homeopathic repertories, lies in the non-uniform distribution of symptoms among homeopathic remedies i.e. overrepresentation of so called polychrests in the repertories.

When using any of the traditional repertorization techniques (weighting schemes), such as sum of symptoms and degrees, this problem creates a statistical bias which tends to favour polychrests and suppress less represented remedies in the evaluation.

The paper describes a mathematical evaluation model, as implemented in Mercurius homeopathic software, intended to resolve this problem and compensate the underrepresentation of small remedies. The model is the first known attempt to resolve this problem, using a pure mathematical (non-empirical) model.

Although clearly linked to commercial advantages, the paper has been made available to homeopathic community to allow discussion, improvements and also possible implementation by other homeopathic software manufacturers, for the benefit of the homeopathic community.

Introduction

As every homeopath should be well aware of - the remedies are reflected differently in the repertories, usually leading with Sulphur counting many thousands of produced symptoms and ending with remedies for which only a handful of symptoms is known. This presents a serious problem in the evaluation phase, as the results are biased in favour of polychrests and smaller remedies tend to be suppressed.

Basically, what the compensated repertory model strives for, is putting the remedies statistically on a more balanced level in the evaluation, thus offering a chance to prescribe even the smallest remedy.

The model is the first known published attempt to resolve the problem in a pure mathematical way. The only comparable effort, that could be named, is Vithoukas Expert System (VES), which, being a black-box model for which no detailed information is publicly available, unfortunately, bears no guarantees as to the quality of the results produced. (beside the famous name attached to it)
VES, however, is an empirical model as opposed to the Compensated repertory model, which is mathematical and relies on no specific repertory.

The paper is divided into several sections. First, some statistical information is presented to the reader, to form a background and justify assumptions used in the compensated repertory model itself. The statistical information presented is computed from Repertorium Universale III by Roger van Zandvoort, which is the largest repertory available to date and thus constitutes the best basis for our research.

Distribution of symptoms in the repertory

Some basic information about the remedies and their distribution among symptoms, can be found in the table below. (Table 1)

	RU III
Number of symptoms with remedies	153 828
Number of remedies	1 753
Number of remedies that occur in at least 100 symptoms	814
Number of remedies that occur in at least 1000 symptoms	323

Table 1

The following information illustrates the problem of over-representation of polychrests in the repertory. Only the symptoms containing remedies are counted.

Position	Remedy name	Number of symptoms	% of total
1	Sulphur	19 460	12,65
2	Phosphorus	16 550	10,76
3	Lycopodium Clavatum	15 248	9,91
4	Sepia Officinalis	15 194	9,88
5	Pulsatilla Pratensis	14 509	9,43
6	Calcareo Carbonica	14 490	9,42
7	Nux Vomica	14 281	9,28
8	Arsenicum Album	14 142	9,19
9	Natrium Muriaticum	13 791	8,97
10	Belladonna	13 726	8,92
11	Rhus Toxicodendron	13 045	8,48
12	Silicea Terra	12 486	8,12
13	Mercurius Solubilis	12 233	7,95
14	Lachesis Muta	11 611	7,55
15	Kalium Carbonicum	11 484	7,47
16	Thuja Occidentalis	11 422	7,43
17	Causticum	11 212	7,29
18	Bryonia Alba	11 190	7,27
19	Zincum Metallicum	10 325	6,71
20	China Officinalis	10 021	6,51

Table 2

Table 2 shows the top 20 remedies sorted by number of non-empty symptoms in the repertory. As we can see, there are major differences even among polychrests, as to the number of symptoms produced. The first Sulphur is linked to almost twice as many symptoms as the last China Officinalis.

Some simple calculations, using the values in the above tables, reveal that the probability of Sulphur leading the evaluation is about 20 times higher than in case of 80% of remedies in the repertory. (those having less than 100 symptoms)

Position	Remedy name	Sum of symptoms and grades
1	Sulphur	36 035,00
2	Pulsatilla Pratensis	30 774,00
3	Phosphorus	29 912,00
4	Nux Vomica	28 590,00
5	Lycopodium Clavatum	27 880,00
6	Calcarea Carbonica	27 834,00
7	Arsenicum Album	27 744,00
8	Sepia Officinalis	27 433,00
9	Belladonna	25 441,00
10	Rhus Toxicodendron	25 186,00
11	Natrium Muriaticum	23 848,00
12	Silicea Terra	23 467,00
13	Lachesis Muta	22 961,00
14	Mercurius Solubilis	22 923,00
15	Bryonia Alba	20 721,00
16	Causticum	19 943,00
17	Kalium Carbonicum	19 685,00
18	Nitricum Acidum	17 679,00
19	Carbo Vegetabilis	17 616,00
20	China Officinalis	17 598,00

Table 3

Table 3 reveals a very similar image of the situation when we sort the remedies by the total score of all the symptoms in the repertory, as computed by the traditional "sum of symptoms and grades" method. This method of evaluation sums up the grade of the remedy in each symptom and computes the total score.

Pondering the values in the tables 1, 2 and 3 reveals the magnitude of the problem.

Occurrence of polychrests in the categories

Every repertory which is used nowadays, relies on certain structure. This structure differs from one repertory to another, but all of them use very similar division of symptoms into basic categories such as Mind, Head, Generalities etc.

We have computed occurrence of the polychrests¹ in these basic categories and have found out that **every one of them had some symptoms in each basic category.**

Category	Remedy	SCRU3	PRU3	SC KENT	PKENT	SC Change %	PERC DIFF
Abdomen	Stramonium	160	2,59	61	2,28	162,30%	0,32
Abdomen	Antimonium Crudum	175	3,30	32	1,45	446,88%	1,84
Abdomen	Apis Mellifera	192	3,49	84	2,83	128,57%	0,66
Abdomen	Gelsemium Sempervirens	193	3,67	75	3,67	157,33%	-0,01
Abdomen	Opium	202	3,60	69	2,99	192,75%	0,61
Abdomen	Hyoscyamus Niger	213	3,53	54	2,28	294,44%	1,25
Abdomen	Anacardium Orientale	228	3,94	63	2,62	261,90%	1,31
Abdomen	Petroleum	234	3,31	92	2,89	154,35%	0,42
Abdomen	Argentum Nitricum	235	3,83	92	3,33	155,43%	0,5
Abdomen	Spongia Tosta	247	4,78	66	3,04	274,24%	1,74
Abdomen	Ferrum Metallicum	251	4,11	111	3,96	126,13%	0,15
Abdomen	Cantharis Vesicatoria	267	4,69	91	3,54	193,41%	1,15
Abdomen	Antimonium Tartaricum	268	5,06	74	3,65	262,16%	1,41
Abdomen	Kreosotum	270	5,11	103	4,75	162,14%	0,36
Abdomen	Iodium	273	4,94	115	4,63	137,39%	0,3
Average						207,29%	0,8

Table 4

Legend:

SCRU3 – Number of symptoms in Repertorium Universale III

SCKENT – Number of symptoms in Kent's repertory

PRU3 – Percentage of total number of symptoms for the remedy in Repertorium Universale III

PKENT – Percentage of total number of symptoms for the remedy in

SC Change – Percentual increase of the number of symptoms from Kent to RU III

PERC DIFF – difference in percentages between Kent

For the purpose of illustration, table 4 shows the number of symptoms for some polychrests for the Abdomen category. "Percentage of Total" column shows what part of all the symptoms of corresponding remedy belong to Abdomen category.

As we can see from the table values, the number of symptoms rise more than two times in average, when comparing Repertorium Universale III and Kent. However, the relation of the number of Abdomen² symptoms for each remedy to the total number of

¹ Polychrest is a vague term in itself. It means a remedy that produces "many" symptoms. For the purpose of our research, we have defined polychrest as a remedy that has at least 5000 symptoms in Repertorium Universale III. According to this definition, there are 75 polychrests. Full list of the remedies can be found in Appendix 1.

² When capital letters are used in such circumstances, it always refers to a category name.

symptoms changed, in average, only insignificantly. (see PERC DIFF column)
In other words, the remedy is represented on about the same level in each category, regardless of the number of symptoms it is now known to produce.
This is an important information for us.

Assumptions:

Upon these facts, we can base an assumption:

A1. When compared to the average relative number of symptoms produced by remedies in a category, if a remedy produces a higher relative number of symptoms in that category, it is a more important remedy for this category and therefore should receive a higher prominence in the evaluation for this category, in case any of its symptoms is selected for the repertorization.

To give an example, if an average relative number of Stomach symptoms is 4% of the total and certain remedy has 20% of the symptoms in Stomach category, it is an important Stomach remedy and should receive a higher score in the evaluation.

As we have already observed, the number of known symptoms raised significantly throughout the years and it is bound to raise in the future too.

It is a fact that polychrests are prescribed more often than smaller remedies and this disproportion is bound to raise, in absolute values.

For example, the number of symptom Sepia symptoms increased from about 7000 in Kent to about 15000 in RU III. However, Viola Tricolor increased from about 600 symptoms in Kent to about 1600 symptoms in RU III.

The relative increase is similar, however the absolute increase creates an even greater disproportion and this is what matters in the evaluation.

It is highly unlikely that the number of Viola Tricolor symptoms will increase 10 times in the next 100 years, **unless it is used more often than in the past 100 years.**

To achieve this, we need to give some boost to the smaller remedies, however this boost must not be arbitrary (by some coefficient, for example), but rather based on certain facts and logical reasoning.

A2. We assume, if a remedy produces less symptoms in a category than an "average"¹ number of symptoms for this category, it is underrepresented and therefore should receive a higher prominence in the evaluation, in case any of its symptoms is selected for the repertorization.

For example, if a remedy produces 2 symptoms in a category where there is an average of 100 symptoms per remedy, the remedy should be boosted, because it is a great chance for us to maximize the usability of the information contained in the repertory. If a remedy produces some Abdomen symptom and even if there are only 2 such symptoms known today, we can safely assume that it produces also some other Abdomen symptoms, which, however are not yet known.

¹ It is uncertain at the moment, what this average value should be, but we will need to define it as a concrete value when we proceed to the implementation phase.

Since there is no other information available, we can only prescribe the remedy on these 2 symptoms and the symptoms that might be matching in other categories.

As there are only 2 symptoms in Abdomen category for this remedy, they are most certainly of grade 1, which would be cause it to "fall down" in the evaluation, if evaluated by traditional sum of symptoms and grades method.

What should be emphasized here, when a homeopath picks one of these two symptoms in the repertorization, he or she **is not aware** that this is one of the two Abdomen symptoms it produces. Therefore, the computer algorithm should heed this fact and make the necessary arrangements to **bring this remedy into the homeopath's awareness**.

Implementation

We have made two assumptions which can be implemented in a variety of ways.

It is necessary to use an implementation model, which achieves reasonable results, even under extreme circumstances. To achieve this level of usability, we have implemented the following rule, how these assumptions should be implemented.

R1. The higher prominence of a remedy in a symptom, calculated by the compensated repertory model, should never exceed a standard prominence of other remedy that is listed in the same symptom in the highest grade.

In practice, this means that a remedy will under no circumstances receive a higher score than a grade 4 remedy in the same symptom.

Implementation of A1

To implement A1 assumption, we have designed an exponential function that suits our purpose very well.

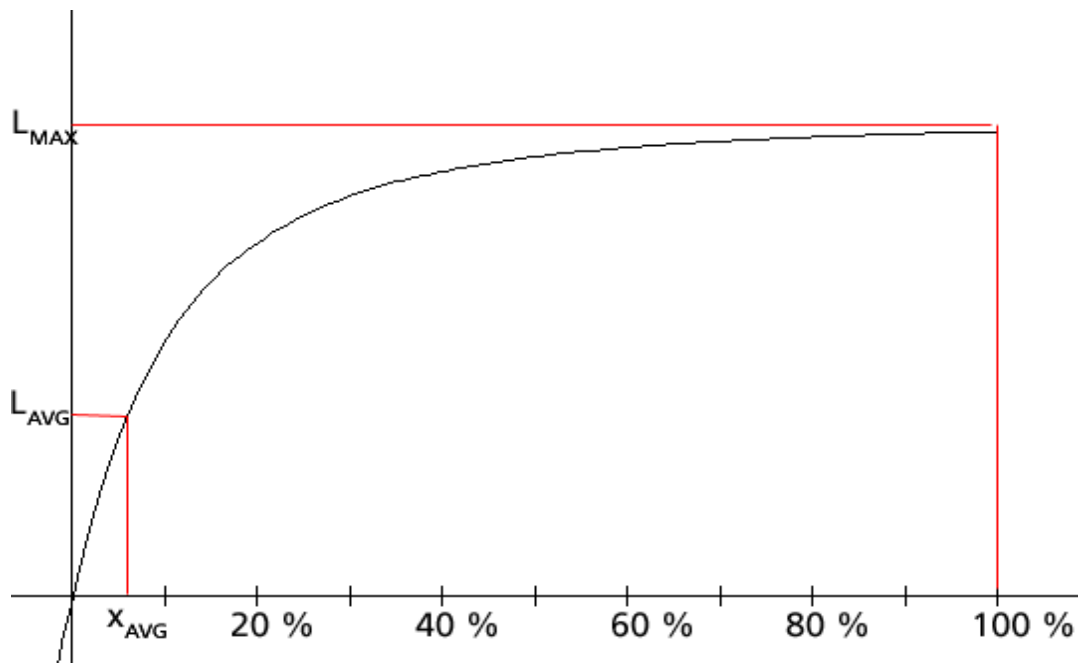
$$F_{A1}(x) = -2000 \frac{a}{x + b} + L_{MAX} + 1$$

$$a = \frac{(1 - x_{AVG}) \log(L_{MAX} - L_{AVG} + 1) \log(L_{MAX} + 1)}{\log 2000 (\log(L_{MAX} - L_{AVG} + 1) - \log(L_{MAX} + 1))}$$

$$b = \frac{a \cdot \log 2000}{\log(L_{MAX} + 1)}$$

Function 1

The graph of this function looks like in the picture below.



Graph 1

where x ranges from 0 to 10000, where 10000 represents the value of 100%.

x – relative number of symptoms produced by a specific remedy in a category

x_{AVG} – average relative number of symptoms produced by remedies in a category

L_{AVG} – average prominence of the remedy having average relative number of symptoms in a category

L_{MAX} – prominence of the remedy with the highest grade in the repertory

The function possesses the following properties:

for $x = 0$, $f(x) = 0$

for $0 < x < x_{AVG}$, $L_{AVG} > f(x) > 0$

for $x = x_{AVG}$, $f(x) = L_{AVG}$

for $x > x_{AVG}$, $L_{MAX} > f(x) > L_{AVG}$

for x converging to infinity, $f(x)$ converges to L_{MAX}

Implementation of A2

To implement an assumption A2, we have created the following function that implements it in a suitable way.

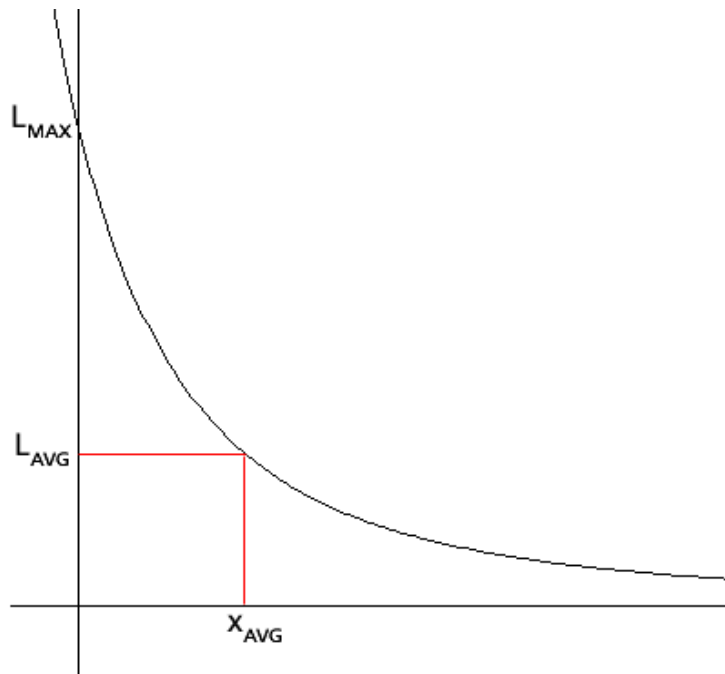
$$F_{A2}(x) = 2000^{\frac{a}{x+b}} - 1$$

$$a = \frac{(1 - x_{AVG}) \log(L_{AVG} + 1) \log(L_{MAX} + 1)}{\log 2000 (\log(L_{AVG} + 1) - \log(L_{MAX} + 1))}$$

$$b = \frac{a \cdot \log 2000}{\log(L_{MAX} + 1)} - 1$$

Function 2

The graph of this function looks like in the picture below.



Graph 2

where x ranges from 1 to infinity

x – number of symptoms for a remedy in a category

x_{AVG} – average number of symptoms per remedy in a category

L_{AVG} – average prominence of the remedy producing average number of symptoms in a category

L_{MAX} – prominence of the remedy with the highest grade in the repertory

The function possesses the following properties:

for $x = 1$, $f(x) = L_{MAX}$

for $1 < x < x_{AVG}$, $L_{MAX} > f(x) > L_{AVG}$

for $x = x_{AVG}$, $f(x) = L_{AVG}$

for $x > x_{AVG}$, $f(x) < L_{AVG}$

for x converging to infinity, $f(x)$ converges to 0

Result function

Since we have two assumptions and two functions that describe the compensation process, we need to put them together somehow, to obtain the final result.

We have decided for the function that gives to the both functions the equal prominence in the resulting function.

$$F_{RESULT} = \sqrt{F_{A1}(x_{A1}) \cdot F_{A2}(x_{A2})}$$

Function 3

The resulting prominence will be used only if natural prominence of the remedy in a symptom is lower than that given by F_{RESULT} .

For example, if the remedy is grade 2 in certain symptom and F_{RESULT} is lower than the prominence of grade 2, F_{RESULT} will not be taken into the evaluation, but rather the natural prominence of grade 2.

Implementation of "average values"

As mentioned earlier, it is not clear how to compute x_{AVG} values i.e. average relative number of symptoms produced by remedies in a category for F_{A1} and average number of symptoms per remedy in a category for F_{A2} .

The problem lies in the fact that the standard deviation of any computed average value (be it standard average or median) is very high and therefore the value is distorted and stripped of any informational value.

Category	Percent	CatRemAvgSymCount	CatRemAvgPercent
Abdomen	1	45	4,45
Abdomen	5	120	4,62
Abdomen	10	192	4,74
Abdomen	15	267	4,78
Abdomen	20	319	4,87
Abdomen	25	383	4,91
Abdomen	30	455	4,87
Abdomen	35	511	4,87
Abdomen	40	534	4,87
Abdomen	45	597	4,87
Abdomen	50	642	4,87
Abdomen	55	656	4,78
Abdomen	60	705	4,78
Abdomen	65	719	4,87
Abdomen	70	765	5,08
Abdomen	75	898	5,57
Abdomen	80	765	4,62
Abdomen	85	765	4,62
Abdomen	90	1 083	5,57
Abdomen	95	1 083	5,57
Abdomen	99	1 083	5,57

Table 5

Legend:

Percent – the range of remedies from which the average values are computed. 5% means remedies that have at least 5% of the number of symptoms produced by a remedy with a maximum number of symptoms.

In RU III, this remedy is Sulphur with 19460 symptoms, so in 5% setting, only the remedies having at least 973 symptoms are taken into the set from which the average is computed.

CatRemAvgSymCount – median number of symptoms per remedy in the category, calculated for remedies fulfilling the condition set by Percent value

CatRemAvgSymPercent – average relative number of symptoms per remedy in the

category, calculated for remedies fulfilling the condition set by Percent value

As we can see from Table 5, average symptoms value is heavily influenced by the conditions set by Percent variable, while the average relative number of symptoms changes only insignificantly.

Since the model boosts the significance of smaller, less known and lower grade remedies, there is no objective rule to decide what Percent variable value should be used as "correct" for computing average values.

In Mercurius, the value is set empirically to 30% by default as it seemed to be a good compromise between reliability of information and the need for compensation of underrepresented remedies.

If the user has a greater trust in reliability of lower-grade-remedies information, he can push the value up or, in other case, tone it down to minimize the action of the compensating process.

Compensating for the errors of omission

Till now we have considered only boosting small remedies in symptoms selected for repertorization. However, it is also possible to compensate the repertory for the errors of omission i.e. for cases when the remedy should be in a symptom, but it is not, either by an error of omission or simply because it is not known to produce such symptom.

One may argue that such an algorithm has only a minor impact on the results of the evaluation, but it is not so in all cases.

Imagine a situation: let's say we have a repertory containing 1000 remedies and a symptom that list 999 of them. We can indeed say that there is almost 100% probability that the remaining remedy should be included in the symptom.¹

For compensating for this, we have calculated average total score per remedy in a category, also taking into account the setting of the Percent variable, as mentioned earlier. For each score, we have also computed the standard deviation and used the sum of the both values for setting an upper limit of the compensation, in theoretical case where all the symptoms of the category have been chosen for the repertorization.

For compensating for errors of omission, we have used the following function:

$$F_{EO}(x) = \frac{C_{AVGCAT} - C_{REMCATSYM}}{C_{CATTOTAL}} \cdot -2000 \frac{a}{x + b} + S_{AVG} + S_{STDEV} + 1$$
$$a = \frac{(1 - x_{AVG}) \log(S_{STDEV} + 1) \log(S_{AVG} + S_{STDEV} + 1)}{\log 2000 (\log(S_{STDEV} + 1) - \log(S_{AVG} + S_{STDEV} + 1))}$$
$$b = \frac{a \cdot \log 2000}{\log(S_{AVG} + S_{STDEV} + 1)}$$

Function 4

where

C_{AVGCAT} – average number of symptoms in the category

$C_{REMCATSYM}$ – number of symptoms in the category for specific remedy, minus number of symptoms in the category for specific remedy, which have been selected for the

¹ And certainty that the said symptom is useless for the purpose of finding the remedy.

repertorization

$C_{CATTOTAL}$ – total number of symptoms in the category

S_{AVG} – average score per remedy for the category

S_{STDEV} – standard deviation of S_{AVG}

x – number of remedies in the symptom

Automatic weights function

One of the important parts of the compensated repertory model is the function for assigning weights to symptoms, based on how many remedies the symptom contains.

The model works on the assumption that the symptom containing less remedies is more valuable than the symptom containing many remedies.

To give an example, "Head pain" symptom containing hundreds of remedies is of little use, as opposed to "pain in the temples ameliorated while sitting" containing only 8 remedies. (in Repertorium Universale III)

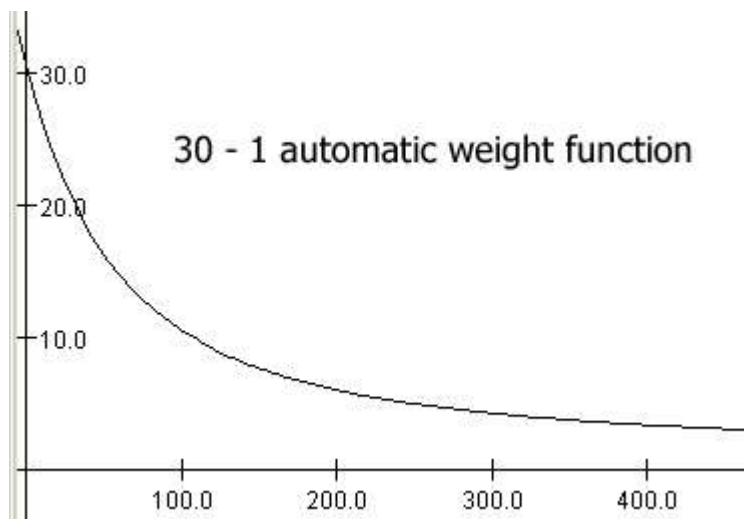
In Mercurius, there are several models of this implemented, they can be switched according to the preference of the user. Model "30-1" is set as a default.

The model "30 - 1" means that the most valuable symptom (containing only one remedy) receives weight 30, while the symptom containing infinite number of remedies receives weight 1.

So it is an exponential function defined in the X range 1 - infinity, with values starting at 30 and converging to 1.

The function graph for 30-1 model can be seen in the picture below.

X axis shows the number of remedies in symptoms, Y axis is the weight.



Graph 3

Test results

We have created a test case, where we entered a few symptoms from the proving of an unknown substance¹ and mixed it with other non-specific symptoms to see if compensated repertory helps in finding the right remedy.

We have included 12 symptoms in the repertorization, 5 of which came from the proving.

Symptoms:

Eyes, phenomena, discharges of mucus or pus, general, yellow

Generalities, modalities, blowing nose, agg.

Head, phenomena, pain, boring, digging, screwing, night

Head, phenomena, pain, boring, digging, screwing, forehead

Head, phenomena, pain, forehead, night, agg.

Mind, phenomena, contented, himself, with

Mind, phenomena, delusions, imaginations, body, body parts, enlarged

Mind, phenomena, fear, people, of, anthropophobia

Mind, phenomena, delusions, imaginations, unreal, everything is

Sleep, phenomena, disturbed, headache, from

Sleep, phenomena, disturbed, dreams, by

Smell, phenomena, odors, imaginary and real, bad

Underlined symptoms are those coming from the proving.

Only the default settings in Mercurius software have been used to perform the tests.

¹ We honestly did not know the name of the substance. The proving was conducted by Janet Snowden with the title "Dreaming Potency - the proving of a medicine prepared from the bark of a tree by the Sangomas of South Africa using a method known as Ubulawo". We know there is no remedy named "Dreaming potency" in Repertorium Universale III, so we wanted to find out, if it is there. The original proving data can be found here <http://www.hominf.org/provings/provbody.htm>

Test 1 – traditional “sum of symptoms and grades” method

Compensation level: 0 %
 Use grades: Yes
 Automatic weights setting: No
 Default symptom weight: 10
 Grade 1 coefficient: 1
 Grade 2 coefficient: 1.5
 Grade 3 coefficient: 2
 Grade 4 coefficient: 3

Results – positions 1-5 (Test 1)

Symptom	Weight	Puls.	Sulph.	Lyc.	Calc.	Phos.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10	4	3	3	3	
Generalities, modalities, blowing nose, agg.	10	4	4	1	3	4
Head, phenomena, pain, boring, digging, screwing, forehead	10	1	1	1	4	1
Head, phenomena, pain, boring, digging, screwing, night	10		1	1		1
Head, phenomena, pain, forehead, night, agg.	10	1	1	1		
Mind, phenomena, contented, himself, with	10					
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10					
Mind, phenomena, delusions, imaginations, unreal, everything is	10					
Mind, phenomena, fear, people, of, anthropophobia	10	4	1	4	1	1
Sleep, phenomena, disturbed, dreams, by	10	3	1	1	3	3
Sleep, phenomena, disturbed, headache, from	10		3	3		1
Smell, phenomena, odors, imaginary and real, bad	10	1	1		1	3
Value		140,0	130,0	120,0	110,0	110,0
Percentage		100	93	86	79	79

Results – positions 6-10 (Test 1)

Symptom	Weight	Sep.	Sil.	Arg-n.	Bell.	Carb-v.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10	3	4	3		1
Generalities, modalities, blowing nose, agg.	10	3	3	1	3	3
Head, phenomena, pain, boring, digging, screwing, forehead	10	1	3	3	4	1
Head, phenomena, pain, boring, digging, screwing, night	10	1		1		1
Head, phenomena, pain, forehead, night, agg.	10		1	1		1
Mind, phenomena, contented, himself, with	10				1	
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10			1	1	
Mind, phenomena, delusions, imaginations, unreal, everything is	10					
Mind, phenomena, fear, people, of, anthropophobia	10	1	1		1	3
Sleep, phenomena, disturbed, dreams, by	10	3	3	3	1	3
Sleep, phenomena, disturbed, headache, from	10					
Smell, phenomena, odors, imaginary and real, bad	10	3			1	
Value		110,0	110,0	100,0	100,0	100,0
Percentage		79	79	71	71	71

Results – positions 11-15 (Test 1)

Symptom	Weight	Caust.	Merc.	Aur.	Con.	Hep.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10	1	3	1		
Generalities, modalities, blowing nose, agg.	10	4	4	4	3	4
Head, phenomena, pain, boring, digging, screwing, forehead	10	1	3	1		3
Head, phenomena, pain, boring, digging, screwing, night	10					
Head, phenomena, pain, forehead, night, agg.	10	1	1			1
Mind, phenomena, contented, himself, with	10	1				
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10					
Mind, phenomena, delusions, imaginations, unreal, everything is	10				1	
Mind, phenomena, fear, people, of, anthropophobia	10	3	1	3	3	1
Sleep, phenomena, disturbed, dreams, by	10	1	1	1	3	3
Sleep, phenomena, disturbed, headache, from	10				1	
Smell, phenomena, odors, imaginary and real, bad	10			1	1	
Value		100,0	100,0	90,0	90,0	90,0
Percentage		71	71	64	64	64

Results – positions 16-20 (Test 1)

Symptom	Weight	Nat-m.	Thuj.	Alum.	Ars.	Kali-c.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10		3	1	1	1
Generalities, modalities, blowing nose, agg.	10	3	3	1		3
Head, phenomena, pain, boring, digging, screwing, forehead	10	3	1		3	1
Head, phenomena, pain, boring, digging, screwing, night	10					
Head, phenomena, pain, forehead, night, agg.	10	1	3		1	1
Mind, phenomena, contented, himself, with	10					
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10					
Mind, phenomena, delusions, imaginations, unreal, everything is	10			3		
Mind, phenomena, fear, people, of, anthropophobia	10	3		1	1	3
Sleep, phenomena, disturbed, dreams, by	10	1	3	3	3	1
Sleep, phenomena, disturbed, headache, from	10	1		1		
Smell, phenomena, odors, imaginary and real, bad	10				1	
Value		90,0	90,0	80,0	80,0	80,0
Percentage		64	64	57	57	57

The first 50 remedies in the evaluation

Puls.	Carb-v.	Ars.	Spig.	Mag-m.	Iod.
Sulph.	Caust.	Kali-c.	Acon.	Nat-c.	Mag-s.
Lyc.	Merc.	Nat-s.	Chel.	Nit-ac.	Plat.
Calc.	Aur.	Agar.	Cocc.	Catha-e.	Sang.
Phos.	Con.	Alco-s.	Dulc.	Ambr.	Spong.
Sep.	Hep.	Anac.	Graph.	Ant-t.	
Sil.	Nat-m.	Cic.	Hydrog.	Bar-c.	
Arg-n.	Thuj.	Lach.	Kali-bi.	Bov.	
Bell.	Alum.	Rhus-t.	Led.	Chin.	

Test 2 – traditional “sum of symptoms and grades” method with compensation

Compensation level: 30 %

Use grades: Yes

Automatic weights setting: No

Default symptom weight: 10

Grade 1 coefficient: 1

Grade 2 coefficient: 1.5

Grade 3 coefficient: 2

Grade 4 coefficient: 3

Results – positions 1-5 (Test 2)

Symptom	Weight	Puls.	Sulph.	Lyc.	Calc.	Phos.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10	4	3	3	3	
Generalities, modalities, blowing nose, agg.	10	4	4	1	3	4
Head, phenomena, pain, boring, digging, screwing, forehead	10	1	1	1	4	1
Head, phenomena, pain, boring, digging, screwing, night	10		1	1		1
Head, phenomena, pain, forehead, night, agg.	10	1	1	1		
Mind, phenomena, contented, himself, with	10					
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10					
Mind, phenomena, delusions, imaginations, unreal, everything is	10					
Mind, phenomena, fear, people, of, anthropophobia	10	4	1	4	1	1
Sleep, phenomena, disturbed, dreams, by	10	3	1	1	3	3
Sleep, phenomena, disturbed, headache, from	10		3	3		1
Smell, phenomena, odors, imaginary and real, bad	10	1	1		1	3
Value		140,0	130,0	120,0	110,0	110,0
Percentage		100	93	86	79	79

Results – positions 6-10 (Test 2)

Symptom	Weight	Sep.	Sil.	Arg-n.	Carb-v.	Caust.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10	3	4	3	1	1
Generalities, modalities, blowing nose, agg.	10	3	3	1	3	4
Head, phenomena, pain, boring, digging, screwing, forehead	10	1	3	3	1	1
Head, phenomena, pain, boring, digging, screwing, night	10	1		1	1	
Head, phenomena, pain, forehead, night, agg.	10		1	1	1	1
Mind, phenomena, contented, himself, with	10					1
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10			1		
Mind, phenomena, delusions, imaginations, unreal, everything is	10					
Mind, phenomena, fear, people, of, anthropophobia	10	1	1		3	3
Sleep, phenomena, disturbed, dreams, by	10	3	3	3	3	1
Sleep, phenomena, disturbed, headache, from	10					
Smell, phenomena, odors, imaginary and real, bad	10	3				
Value		110,0	110,0	107,9	101,2	100,0
Percentage		79	79	77	72	71

Results – positions 11-15 (Test 2)

Symptom	Weight	Bell.	Merc.	Catha-e.	Aur.	Nat-s.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10		3	1	1	1
Generalities, modalities, blowing nose, agg.	10	3	4		4	1
Head, phenomena, pain, boring, digging, screwing, forehead	10	4	3		1	3
Head, phenomena, pain, boring, digging, screwing, night	10					
Head, phenomena, pain, forehead, night, agg.	10		1			
Mind, phenomena, contented, himself, with	10	1		2		
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10	1		1		
Mind, phenomena, delusions, imaginations, unreal, everything is	10			1		
Mind, phenomena, fear, people, of, anthropophobia	10	1	1	1	3	1
Sleep, phenomena, disturbed, dreams, by	10	1	1		1	3
Sleep, phenomena, disturbed, headache, from	10					1
Smell, phenomena, odors, imaginary and real, bad	10	1			1	
Value		100,0	100,0	97,5	94,6	92,0
Percentage		71	71	70	68	66

Results – positions 16-20 (Test 2)

Symptom	Weight	Hep.	Thuj.	Con.	Nat-m.	Alco-s.
Eyes, phenomena, discharges of mucus or pus, general, yellow	10		3			1
Generalities, modalities, blowing nose, agg.	10	4	3	3	3	4
Head, phenomena, pain, boring, digging, screwing, forehead	10	3	1		3	1
Head, phenomena, pain, boring, digging, screwing, night	10					
Head, phenomena, pain, forehead, night, agg.	10	1	3		1	
Mind, phenomena, contented, himself, with	10					
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	10					
Mind, phenomena, delusions, imaginations, unreal, everything is	10			1		
Mind, phenomena, fear, people, of, anthropophobia	10	1		3	3	1
Sleep, phenomena, disturbed, dreams, by	10	3	3	3	1	1
Sleep, phenomena, disturbed, headache, from	10			1	1	
Smell, phenomena, odors, imaginary and real, bad	10			1		
Value		91,9	90,2	90,2	90,0	86,7
Percentage		66	64	64	64	62

The first 50 remedies in the evaluation

Puls.	Caust.	Nat-m.	Anac.	Cocc.	Nit-ac.
Sulph.	Bell.	Alco-s.	Kali-sil.	Chel.	Nat-c.
Lyc.	Merc.	Cic.	Agar.	Kali-bi.	Acon.
Calc.	Catha-e.	Mag-s.	Dulc.	Chin-s.	Aster.
Phos.	Aur.	Hydrog.	Mag-m.	Sang.	Euphr.
Sep.	Nat-s.	Alum.	Rhus-t.	Kola.	
Sil.	Hep.	Kali-c.	Lach.	Bov.	
Arg-n.	Thuj.	Ars.	Aur-s.	Graph.	
Carb-v.	Con.	Spig.	Led.	Ambr.	

Test 3 – traditional “sum of symptoms and grades” method with compensation and automatic weights

Compensation level: 30 %

Use grades: Yes

Automatic weights setting: Yes

Grade 1 coefficient: 1

Grade 2 coefficient: 1.5

Grade 3 coefficient: 2

Grade 4 coefficient: 3

Results – positions 1-5 (Test 3)

Symptom	Weight	Sulph.	Lyc.	Catha-e.	Puls.	Arg-n.
Head, phenomena, pain, boring, digging, screwing, night	27	1	1			1
Mind, phenomena, contented, himself, with	23			2		
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	23			1		1
Sleep, phenomena, disturbed, headache, from	23	3	3			
Smell, phenomena, odors, imaginary and real, bad	22	1			1	
Mind, phenomena, delusions, imaginations, unreal, everything is	17			1		
Eyes, phenomena, discharges of mucus or pus, general, yellow	16	3	3	1	4	3
Head, phenomena, pain, forehead, night, agg.	16	1	1		1	1
Head, phenomena, pain, boring, digging, screwing, forehead	12	1	1		1	3
Mind, phenomena, fear, people, of, anthropophobia	11	1	4	1	4	
Generalities, modalities, blowing nose, agg.	7	4	1		4	1
Sleep, phenomena, disturbed, dreams, by	7	1	1		3	3
Value		194,0	180,0	175,8	166,0	157,3
Percentage		100	93	91	86	81

Results – positions 6-10 (Test 3)

Symptom	Weight	Sep.	Phos.	Bell.	Cic.	Calc.
Head, phenomena, pain, boring, digging, screwing, night	27	1	1			
Mind, phenomena, contented, himself, with	23			1	1	
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	23			1	1	
Sleep, phenomena, disturbed, headache, from	23		1			
Smell, phenomena, odors, imaginary and real, bad	22	3	3	1		1
Mind, phenomena, delusions, imaginations, unreal, everything is	17				1	
Eyes, phenomena, discharges of mucus or pus, general, yellow	16	3				3
Head, phenomena, pain, forehead, night, agg.	16					
Head, phenomena, pain, boring, digging, screwing, forehead	12	1	1	4		4
Mind, phenomena, fear, people, of, anthropophobia	11	1	1	1	4	1
Generalities, modalities, blowing nose, agg.	7	3	4	3		3
Sleep, phenomena, disturbed, dreams, by	7	3	3	1	1	3
Value		154,0	152,0	136,0	130,4	129,0
Percentage		79	78	70	67	66

Results – positions 11-15 (Test 3)

Symptom	Weight	Sil.	Carb-v.	Hydrog.	Caust.	Nat-s.
Head, phenomena, pain, boring, digging, screwing, night	27		1			
Mind, phenomena, contented, himself, with	23				1	
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	23			1		
Sleep, phenomena, disturbed, headache, from	23					1
Smell, phenomena, odors, imaginary and real, bad	22					
Mind, phenomena, delusions, imaginations, unreal, everything is	17			3		
Eyes, phenomena, discharges of mucus or pus, general, yellow	16	4	1	1	1	1
Head, phenomena, pain, forehead, night, agg.	16	1	1		1	
Head, phenomena, pain, boring, digging, screwing, forehead	12	3	1		1	3
Mind, phenomena, fear, people, of, anthropophobia	11	1	3		3	1
Generalities, modalities, blowing nose, agg.	7	3	3	1	4	1
Sleep, phenomena, disturbed, dreams, by	7	3	3	1	1	3
Value		127,0	123,4	117,8	117,0	114,3
Percentage		65	64	61	60	59

Results – positions 16-20 (Test 3)

Symptom	Weight	Con.	Merc.	Mag-s.	Nat-m.	Aur.
Head, phenomena, pain, boring, digging, screwing, night	27					
Mind, phenomena, contented, himself, with	23			1		
Mind, phenomena, delusions, imaginations, body, body parts, enlarged	23					
Sleep, phenomena, disturbed, headache, from	23	1			1	
Smell, phenomena, odors, imaginary and real, bad	22	1				1
Mind, phenomena, delusions, imaginations, unreal, everything is	17	1				
Eyes, phenomena, discharges of mucus or pus, general, yellow	16		3			1
Head, phenomena, pain, forehead, night, agg.	16		1	1	1	
Head, phenomena, pain, boring, digging, screwing, forehead	12		3	1	3	1
Mind, phenomena, fear, people, of, anthropophobia	11	3	1		3	3
Generalities, modalities, blowing nose, agg.	7	3	4	1	3	4
Sleep, phenomena, disturbed, dreams, by	7	3	1	1	1	1
Value		112,4	111,0	108,5	106,0	105,8
Percentage		58	57	56	55	55

The first 50 remedies in the evaluation

Sulph.	Calc.	Nat-m.	Kali-sil.	Kali-bi.	Nicc.
Lyc.	Sil.	Aur.	Chin-s.	Sang.	Plut-n.
Catha-e.	Carb-v.	Alum.	Kola.	Mag-m.	Haliae-lc.
Puls.	Hydrog.	Dulc.	Calx-b.	Lat-h.	Aids
Arg-n.	Caust.	Thuju.	Alco-s.	Kali-c.	Spig.
Sep.	Nat-s.	Ars.	Nit-ac.	Aster.	
Phos.	Con.	Anac.	Agar.	Led.	
Bell.	Merc.	Lsd.	Succ.	Aur-s.	
Cic.	Mag-s.	Cocc.	Hep.	Par.	

The only remedy with the matching symptoms is **Catha Edulis** (Catha-e.), so this must be our unknown substance.

Using the full compensated repertory model, it appears at the position 3 in the evaluation as the only remedy among many polychrests.

The following table compares the position of Catha Edulis in the evaluation by different methods.

	Position of Catha-e.	Compensation Level	Automatic symptom weights
Test 1	40	-	No
Test 2	13	30,00%	No
Test 3	3	30,00%	Yes
Test 4	2	45,00%	Yes
Test 5	1	75,00%	Yes

Table 6

Conclusion of the tests

As it is clear from the Table 6, uncompensated model of evaluation (Test 1) proved completely useless as it evaluated the correct remedy at position 40, which hardly draws anyone's attention.

Compensation without different symptom weights performed better, but still position 13 is on the border of getting any attention of the homeopath.

Full compensated repertory model with automatic symptom weights performed the best and the matching remedy ranked at position 3, which is certainly a noteworthy position. Increasing the compensation level even moved it to position 2 or 1 for corresponding compensation levels.

Appendix 1

List of polychrests in Repertorium Universale III

<i>Aconitum Napellus</i>	<i>Kalium Bichromicum</i>
<i>Agaricus Muscarius</i>	<i>Kalium Carbonicum</i>
<i>Alumina</i>	<i>Kalium Nitricum</i>
<i>Ammonium Carbonicum</i>	<i>Kreosotum</i>
<i>Ammonium Muriaticum</i>	<i>Lachesis Muta</i>
<i>Anacardium Orientale</i>	<i>Lycopodium Clavatum</i>
<i>Antimonium Crudum</i>	<i>Magnesium Carbonicum</i>
<i>Antimonium Tartaricum</i>	<i>Magnesium Muriaticum</i>
<i>Apis Mellifera</i>	<i>Mercurius Solubilis</i>
<i>Argentum Nitricum</i>	<i>Mezereum</i>
<i>Arnica Montana</i>	<i>Muriaticum Acidum</i>
<i>Arsenicum Album</i>	<i>Natrium Carbonicum</i>
<i>Aurum Metallicum</i>	<i>Natrium Muriaticum</i>
<i>Baryta Carbonica</i>	<i>Natrium Sulphuricum</i>
<i>Belladonna</i>	<i>Nitricum Acidum</i>
<i>Borax Veneta</i>	<i>Nux Vomica</i>
<i>Bryonia Alba</i>	<i>Opium</i>
<i>Calcarea Carbonica</i>	<i>Petroleum</i>
<i>Cantharis Vesicatoria</i>	<i>Phosphoricum Acidum</i>
<i>Carbo Animalis</i>	<i>Phosphorus</i>
<i>Carbo Vegetabilis</i>	<i>Platinum Metallicum</i>
<i>Causticum</i>	<i>Plumbum Metallicum</i>
<i>Chamomilla</i>	<i>Pulsatilla Pratensis</i>
<i>Chelidonium Majus</i>	<i>Rhus Toxicodendron</i>
<i>China Officinalis</i>	<i>Sarsaparilla Officinalis</i>
<i>Cocculus Indicus</i>	<i>Sepia Officinalis</i>
<i>Colocynthis</i>	<i>Silicea Terra</i>
<i>Conium Maculatum</i>	<i>Spigelia Anthelmia</i>
<i>Cuprum Metallicum</i>	<i>Spongia Tosta</i>
<i>Digitalis Purpurea</i>	<i>Stannum Metallicum</i>
<i>Dulcamara</i>	<i>Staphysagria</i>
<i>Ferrum Metallicum</i>	<i>Stramonium</i>
<i>Gelsemium Sempervirens</i>	<i>Sulphur</i>
<i>Graphites</i>	<i>Sulphuricum Acidum</i>
<i>Hepar Sulphur</i>	<i>Thuja Occidentalis</i>
<i>Hyoscyamus Niger</i>	<i>Veratrum Album</i>
<i>Ignatia Amara</i>	<i>Zincum Metallicum</i>
<i>Iodium</i>	