Going through, taking in, considering

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(edited from a translation by Balindt-Small)

A Three phase learning as a method for "Teaching In Epochs"[1]

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We would like to elaborate certain phases of teaching by, deliberately, taking an example from our everyday life. Occurrences which usually take place in school may, for the time being, be projected onto a private situation. So let us have a try on three phases and imagine the following :

Phase I A couple is going to a birthday party. Good luck! - A lot of guests, a lot of confusion.

Phase II On their way home, they ponder on what happened and on some of the characters

Phase III The next morning, they start to debate anew :

- in what way were the guests related to each other and to the host
- which news about the world did one learn from them
- how would one wish to celebrate a coming birthday; what do birthdays really demand, anyway …?

Are these really three phases? Let's have a look again at what exactly happens here.

At the beginning, one just throws oneself into the crowd (I). One makes acquaintances without thinking about it and enjoys meeting the people who turn up. Any form of investigation or classifying would only be distracting. - Afterwards, all that is resounding in both of them (II); both are still preoccupied with what they experienced[2] and, while talking it over, their emotions unite the details automatically. The ups and downs of the party now appear more as a related "whole" and less as a mere series of events. Something that was frightening changes into a deep impression, rejoicing into true interest, a muddle into a sequence of related scenes. –

Later on, one dissects that "whole" again into fragments and discusses their interrelations (III). One examines how this relates to that, who had secretly wanted what or who had suffered, and so on (a). One is digging for insights, for knowledge (b). Finally, one ponders, asks what consequences will follow; and also, how one oneself could achieve something (c).

Before we start to talk about school lessons, the above story has demonstrated how the three elements of the elaborated method work in real life.

An Example

1. **Going through on your own (enterprising, joining in, experiencing) = Phase I**

We imagine teaching physics, perhaps in Grade 8; and we are experimenting.

a. The pupils stream out of the school building. Soon they are gathered around a flexible tube of which the end is immediately lifted up the wall of the house until it reaches a window. There, it is held 12 metres above the ground.

1 This paper was written during the work on the project *Phenomenological Natural Science and Human Didactics.* On conferences and courses it served as a text for introduction, reflection, and fixation. At the same time, it can be regarded as an example for how to organise teaching-lessons. (Pädagogische Forschungsstelle beim Bund der Freien Waldorfschulen Stuttgart, Abt. Kassel, Brabanterstr. 30, 34131 Kassel).

2 perhaps, humming softly the refrain of a song, like e. g. "Going through, Singing about …".

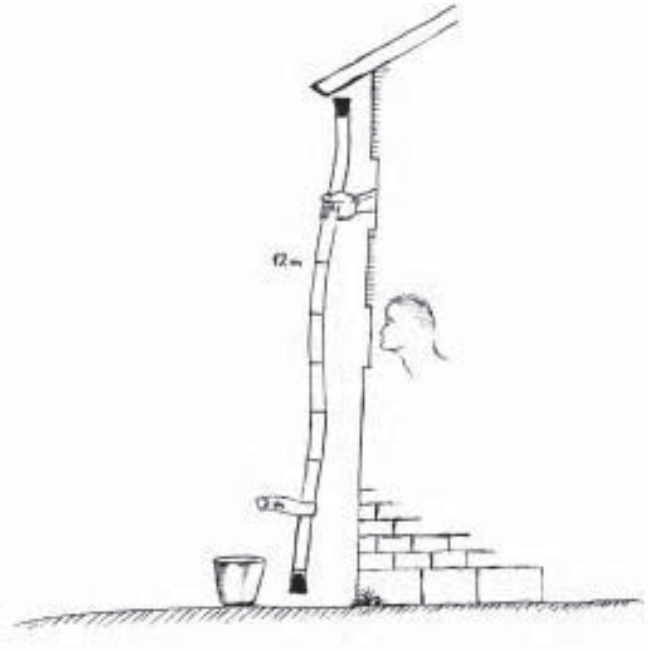

Figure 1 : A filled-up tube with marks every two metres is hanging down a wall. The second mark at the lower end bears a little flag with "2 m" written on it. The bucket is filled to the brim with water.

The tube, about 3 cm in diameter and made of transparent plastic, has a plug at each end and is completely filled with boiled and slightly coloured water; there is no air in it. Every two metres it is marked with a line.

b. The lower end is now dunked into a bucket which is filled to the brim with water. Someone puts his hand into the water which causes an overflow and, after counting "1, 2, 3 !" the plug under water is pulled out. Immediately, several metres of the water fall down into the bucket. But, surprisingly enough, most of the water remains hanging in the tube. The water level settles down around the 10 m-mark. Now, from the top downwards to appr. 8 m height, the tube is "squeezed" in the middle.

Figure 2 : Cross-section of the squeezed tube in approximately 9 m height, after the water level has fallen to 10 m.

After the bucket has been refilled, an assistant in the window draws the attention to the water level in the tube. The students now count the metre marks down to the surface of the water in the filled-up bucket. The number remains the same, even when the upper part of the tube is moved downwards or when the bucket is lifted upwards ….

c. When, just for a short moment, the lower end of the tube is taken out of the bucket, approx. 1 m of water runs out and its space is replaced by air. This air rises in the tube as a stretching bubble, and, afterwards, the water level is several metres lower than before.

d. If the upper plug is pulled out, the remaining water column shoots into the bucket, causing again an overflow. The tube is thrown to the ground. Now it is straight again, that means, it is no longer squeezed like in Fig. 2.

2. **Common Recollection in Class = Phase II.**

Back in the classroom, the teacher characterises the experience, accompanied by various calls or answers from the students: however, without explaining a thing! That is done by using more personally coloured words like, "Wow! What are we going through here!" E.g., when recalling the tube lying on the ground, evokes a feeling of how everything was at rest, the water being closed in. Looking back at the tube hanging in the air, there is an impression that the situation was somehow full of tension, as if the water would come running out at any moment. Who would have been the first to get wet? Did the situation seem to be dubious for somebody, perhaps, when we built a sort of barrier in the bucket – a barrier for the tube water out of water???

After all, it came to a stop somehow. Isn't it amazing what our teacher is able to achieve? Maybe, the air was helping, the air that surrounds everything. … What a relief that, later on, with just one tug this spooky phenomenon was gone.

Robin Bacchus, recently visiting as guest mentor to the Leichuan Waldorf School (Taichung, Taiwan), showed this article by von Mackensen to their physics teacher, Shaun Hsu.

Shaun was teaching a Class 8 physics block in March 2010 and was keen to try it out - as the photos show.

Leichuan Waldorf School, Taiwan: water barometer experiment in action

Students controlling the top of the barometric tube

Half way up the barometric tube

Tub at the base of the experiment

A recollection like this, led by the teacher, should be carried out with sympathy and benevolence – towards the objects, the occurrences and also towards the participating humans; no harsh questions, no forced explanations. One accepts everything that gets mentioned; as you would do during a good meal in a mountain hut after a tiring alpine tour. A common feeling should be kept up, serene or stimulating. Objective judgements of facts, such as cause and effect, for example, should be avoided or simply ignored. Thus, only collective images that can be recalled arise (what followed what …).

But, nonetheless, this recollection was not at all purely subjectively roaming. Only through the fact that the teacher calls the attention of the students to the closed-in water, the air and the way the water runs out, as well as to the "ocean of air", could the beginning of explanations be anticipated. It is this anticipation that should be worked towards during the characterisation.

Perhaps, someone writes some key words on the blackboard so that everybody will remain focussed of this common experience. The beginning of a sketch similar to Fig. 1 may also be drawn on the blackboard.

3. Questioning and considering the facts = Phase III.

On the next morning, the pupils bring along their completed drawings, similar to Fig. 1, as well as their personal review of the experiment – which in no way must resemble an impersonal technical description. (How to create both, see below.) The ideas and imaginations concerning the course of the experiment that have been called up the day before (see the above paragraph) have now "settled down". Particular turning points are recalled into the common awareness (conciousness) with a few repetitive questions. Only now follows the elaboration of the case as such. It begins with questions about inter-connections as well as with explanations and widening reflections :

- Could the upper plug hold the water column from above – without any threads between the bottom of the plug and the surface of the water? If not :
- Could the water in the bucket carry the water column from below; does the size of the bucket play a role here? If not :
- Could the water in the bucket at least slow down the running out?
- What is it that squeezes the tube; and why isn't the lower end squeezed, too?
- What is contained in the tube above the water level?
- After arriving at the idea of a force from the air, we can ask: how strong was the carrying force of the air pressure, expressed in metres of water column? How many metres would it be, if we used other liquids (salt water, oil …) Would that water column have the same height everywhere on earth and at all times?
- Does the air temperature play a role? Yes, through the vapour pressure, at 20^{O}C it is 23 millibar which equals 23 cm of water column. But these finer details don't have to be explained in Grade 8 yet, neither all of the above questions, but why?.

It is of great importance that individual opinions come up in the class, as engaged and diverse as possible. The more original and even more fantastic they are, the more they stimulate. Thus, the students will be impressed by a certain aspect. For instance, that neither the water in the bucket nor the upper plug bring about a force that can hold up the water level, or even draw it back when it swings downwards. But, that there is rather something invisible at work here, namely the concept of an "endless ocean of air".

And, moreover, it is important, that the standard aeromechanical explanation with the help of the pressure of the outer air upon the water surface

in the bucket should not be ruling alone here[3], but should be expanded through 'vaguely'-qualitative elements like "unlimited", "ocean of air", "horror vacui"[4]. Those elements direct the attention less to the mechanical facts. They rather lead the students to feel, to understand, maybe even to immerse themselves in a subject. This is the only way to motivate a pupil towards a lasting inner striving for knowledge and learning. In addition to the logical subjects and the pure qualitative aspects, there might arise more widening questions, like changes of the air pressure, the influence of the weather, breathing in relation to the flying heights of airplanes and so on.

Discussing the Method

A. Making Use of the Night

The advantages of a teaching in two-day loops, partly already evident in the above example, will be obvious especially if the subjects are taught in blocks, i.e. the teaching of technical subjects should occur in epochs so that the nightly process of ripening can be included. What can we do to activate this process? A part of the answer is given in chapter 2 of the reference sited in footnote 1, page 13. Work was done, in a non-informative but, nevertheless, systematic, theme-orientated way, with the aim of: "Getting an impulse to move on instead of receiving information". Such an effort pays off immediately causing sympathy and, in the end, leading to a successful level of education (a well-known experience in practice). The well-prepared process of ripening during the night is even generally known and nowadays scientifically observed[5], but, since it is cognitive-psychological, it is never simply deducible. – With the above exemplified model of the three steps in two days, "Two-days-three-steps-model of learning in epochs", we have a practical method at hand that is proven and certainly an ingenious invention, no matter by whom : here, it should just be presented in a form that is ready for use.

Its core derives from the question : how could it be achieved that the student not only gains a profit for mind and behaviour, but that, with every subject, is a step forward in existence and individual development? A single subject in school has to be more than the sum of communicable notions and definitions. That means, closer to life, to reality and, therefore, also dark. At first, the subject has to be introduced to the class in open and sensitive terms that warmly flow around the student and then develop into seeds, so that they won't get emotionally petrified by being exposed to mere definitions and final statements. And still, these open terms should provide a basis for a deeper elaboration of the matter, since everything has to end in professional knowledge. – How could this, generally, be achieved?

B. The various Activities of the Teachers

1. Concerning Phase I

First of all, our experiment was intended to provide more than mere information. It should not convey teaching material but, structured by the teacher, the dark reality of the world (this concept of reality may, for the time being, remain unexplained). In any case, the student should, at first, save his perceptions as inner pictures ("… now he takes that – there, that is dangling …"), without understanding them technically. For that, he, naturally, combines all his recollections with his observations, in order to identify them somehow as objects. This is a really demanding

3 It is well known that the actual air pressure drives the water against a vacuum up to a height of about 10 m above the surface of the water upon which the air presses; no matter whether the tube is sloping or lying in waves. These data can only be approximate because the air pressure changes with the weather, often hours till days in advance; i. e. about +5 or -10 %; and also because it generally decreases along with the height above sea level (in 5.500 m by 50 per cent).

4 It is the term for an experience, based on the experience that the world is lacking any natural, continuous vacuum spaces. For thousands of years, the "horror vacui" as an important fundamental force of earth and heaven was attributed to the universe and, thus, philosophically classified. Today, we rather regard it as a continuous pictorial gesture of nature.

5 Wagner, U. et al.: Sleep inspires insight; NATURE 427, 352 … 355 (2004).
Fischer, St. et. al.: A Role for Sleep in Memory; Journal of Cognitive Neuroscience (MIT) 18 (3) 311 (2006).

an exhausting process, since all the impressions will hit him shapeless and hard. – Basically, the teacher and the students, since they are completely immersed in the matter, both enjoy all that is developing here.

The teacher provides the students with objects and facts as well as with impulses for his soul by an elaborated experiment (in other school subjects we use pictures, narratives, music, sight-seeing tours …). He creates a configuration. The student adapts to that. Therefore, this first step regarding the mental activity of the students could be called deliberate or determined (volitional). For, they were fully dependent on all of their physical sense organs. They adapted themselves to the situation in an interactive way – which, indeed, provides a basis for any decisive will to act.

2. Concerning Phase II

Looking merely at information, it is just a repetition of Phase I. In reality, however, everything is different. Nothing at all gets repeated: completely different mental powers are devoted to a problem when the person moves from one inner activity to the next: at the beginning, he used his will, now his feelings. In Phase I, the pupil struggled to sort out their own recollected imaginations, Now, these imaginations are picked up in class and the group process helps to harmonise and confirm them. The emotions of all group members are flowing together, so that a cheerful sense of community replaces the preceding silent feeling of helplessness and captivation. Through this, the unconnected facts of the initial confrontation are brought on a way towards being embedded in something greater. In Phase I, the inner pictures of the pupil are pushed back and forth by the outer occurrences. In Phase II, they will be mentally refreshed in such a way that they can serve as a seedbed for something new, mentally as well as intellectually, which ought to grow during Phase III; even if, superficially, the experimental noises are, at first, only followed by nice word noises. In any case, the students will begin to look out for the context of it all. Connecting links seem to emerge. The pupil even gets the impression that they achieved something. - At this stage, the teaching may pause for now.

3. Concerning Phase III

In Phase II, the emotional solidification of the swirling impressions of Phase I, formed a solid basis for the now beginning settlement by pondering about it as well as for a new construct of ideas. This was caused, on the one hand, by writing down a review of the experiments, quite possibly in the style of Phase II, on the other hand, by the natural settling-down and the ripening process during the night. On the next morning, the gelled imaginations will call for evaluation, expansion and categorising by a joint exchange of ideas in class! Only thereafter, the time has come to start the necessary general survey; and for the teacher to deliver broader contemplations, like e. g. why is this topic so important? What else does belong to it? The history of discoveries in this field, special tools and measuring devices, technical applications or/and accidents may come into the view; ecological problems are to be considered[6]. – At the end, during the final lecture of the teacher, the group process is carried by a sense of community and sympathy. Before that, however, during the process of questioning and searching, severity and distance have been prevailing, i. e. antipathy, contracted into mere facts.

Expansion

Only within the third phase, the first part of the double period on the second day, arises a general realisation (cognition) out of the individual change of experiences, practical knowledge and actions. So, the conventional “aim of the lesson” is only to come on the second day, but then, however, larger and deeper than would have been possible on the day before – provided, everything went well. The knowledge aimed at will be achieved as an

6 How to include the above mentioned in the epoch of physics lessons of Grade 8 as well as more information about air pressure and similar topics is to be found in: M. v. Mackensen: Klang, Helligkeit und Wärme [Sound, Light and Warmth]; Verlag Bildungswerk, Kassel, 2005. Air pressure problems for the air traffic are described in Hofberger/Mackensen: Flug, Landung, Absturz [Flight, Landing, Crash]; Verlag Bildungswerk, Kassel 2009 (in preparation).

educational aim, for, in such a way, it's light also shines into general world problems as well as into the personal power and abilities.[7]

Other scientists, too, are striving for such a way in three phases. Klaus Schmidt, one of the most famous and successful archaeologists of the present time talks about strategies like this, when he tries to comprehend the "oldest monuments of mankind"[8], in this case the complex structure of an entire excavated temple city.[9] This early metropolis was founded with all its buildings, murals and other objects of art at the end of the glacial epoch. It is not yet known why, after several thousands of years, the whole town had been completely filled up again, buried up to the wall copings in the barren seclusion of Anatolia up to our time, – a phenomenon that seems to be from another world.

And yet, here lies the origin of our culture, upon which followed the ancient empires and, finally, Europe. "To look at, to describe, to understand", that is now the general working plan of the research team at Göbekli Tepe. Three separate steps! Otherwise, the unexpected would be overwhelming. We, immediately, see that these steps basically correspond to our three phases; provided, the aim is not only to categorise the structures of the excavated objects but also to sort out the mental state of the humans involved.

And indeed, where would we end up, if teaching would not be life itself?

Seeing the above as a whole, we elaborated the following:

Phase I	An attentive observation, active in all our senses – suffering from the world physically	The impact of single objects and impressions from outside - The WILL is challenged
Phase II	Feeling the characteristics of one's own experiences – a taking and giving	Interaction of opinions and stirrings in the mental state feelings and emotions surge up
Phase III	A fierce chopping into pieces, reconnecting them, followed by expanding them – Moving the thoughts around	An approach to the spiritual powers of the world, The thinking becomes creative.

Phase II works for the short time memory, the efforts in thinking of Phase III for the long-term one. And if the latter also open up the mind to make out the intrinsic character of man and world, the striving for knowledge becomes education. Then, a stepping through the three phases will encourage the student to remain committed to their world. – This would be an initial exercise for their later freedom which would then be: not to let oneself be rinsed arbitrarily by pleasure, but to find fulfilment in one's own awareness and conscious actions. – That far reaches the influence of school.

These three steps should grasp the entire adolescent person: body, soul and mind. And in their soul: in thinking, feeling and will (R. Steiner[10]). And always all the three simultaneously, just differently combined. That needs to be elaborated more deeply. – However, by no means, solely imagination and logic are demanded. We did point out in the above paragraph (Section A of this Chapter) : a progression from a mere transfer of information to a step forward in life, i. e. from an abstract learning towards a real development. Transformation instead of information.

7 In which way the different judging forces of the mind are at work in all three phases and how they consequently open up the logical technical subject to the desired broader "over-logical" extensions, the author describes in "Urteilstätigkeiten …"; Verlag Bildungswerk Kassel, Brabanterstr. 30, D-34131 Kassel, 2008.

8 This is also the title of the book. German Edition: "Vor 12000 Jahren in Anatolien. Die ältesten Monumente der Menschheit"; Clemens Lichter (Hrg.), Theiss-Verlag Stuttgart, 2007.

9 Klaus Schmidt; "Sie bauten die ersten Tempel: Das rätselhafte Heiligtum der Steinzeitäger"; dtv München 2008, page 190.

10 R. Steiner 1919, GA 293 [Study of Man] and 1921, GA 302 [Education for Adolescence], there especially Lecture III.