Dear Fellow Collector,

Dear reader of the PLUMB BOB NEWS,

Please, as always I am in search of new photos, catalogs, articles or personal stories about any aspect of PLUMB BOBS from you. Any help is appreciated.

If you have any information or pictures for these themes, please let me know.

Thank you, looking forward to hearing from you.

Wolf

ATKINSON, CHRISTEN AND FAUSTMANN HYPsomETERS

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1. INTRODUCTION

The small plumb bob – the center of our collections – needs only the gravity of the earth for working. No electricity, no other power.

In my collection I have also some instruments called **inclinometer or hypsometer** to measure the height of trees or buildings. One of them you know already from my newsletter 2009-04 THE FAUSTMANN MIRROR HYPsomETER. It was invented by the German forester Martin Faustmann in **1854** and uses a small plumb bob to measure the height of trees. About this instrument you will find an update here with new information about the version sold by **K&E** in the U.S.A between 1904 and the 1930s and more about different versions of this mirror hypsometer made by the optician **Neuhöfer & Son, Wien, Austria.**

But there are also small inclinometers or hypsometers where the body is nearly working like a plumb bob, only with the gravity force. These are so called pendulum hypsometers. I will talk about the English **Atkinson hypsometer of 1872** from my collection and the patented Swiss **Christen hypsometer of 1891** from the collection of my friend Ulrich Biber. Both are mentioned in English and American books about forestry.

Above: FAUSTMANN mirror hypsometer made by K&E, NY, U.S.A
Left: CHRISTEN hypsometer from Switzerland
Below: ATKINSON hypsometer from England
2. THE ATKINSON HYPsomETER 
FROM 1872

THE ATKINSON / ROBSON STORY

The short story of a GOOD IDEA in 1872 which was POORLY IMPLEMENTED.

While rummaging in my museum, I found a small mahogany box (case) with the (bad) stamped name MH ATKINSON with dimensions 5” x 2¾” x ¾”

Inside was an isosceles triangular brass instrument ATKINSON Hypsometer, manufactured by F. ROBSON 45 DEAN STREET, NEWCASTLE with an interesting operating instructions. Dimensions of the instrument: perpendicular sides 3”, hypotenuse 4 ¼” and 1/32” thick. The operator’s manual was printed in a triangular shape, which corresponded to the isosceles instrument. The device was in good physical condition but has suffered some chemical attack at one corner which has affected the case, the hinge and the paper of the instruction, so I had to take a closer look at the text to find out the address of the maker.

For the translation from English into German I then retyped the text and discovered a white spot in the middle of the text. I thought it was also a water spot (although the text appeared complete to me). For safety’s sake, I asked some friends in the U.S.A. They confirmed to me: There is nothing missing.
A look through my magnifying glass showed clear text and a "white spot". Such a white spot in a manual "screams" to me for an explanation and investigation. The readability of the headline was also influenced by a large hole that was caused by one of the two pins (points) on which the instrument in use is held between the thumb and the index finger.

Here are the operating instructions: xxxxxx= white spot

"Manufactured by F. Robson, 45 Dean Street
Newcastle

The triangle is to be suspended between the thumb and forefinger of the left hand, knuckles down, upon the points passing xxxxxxx through it, and allowed to swing freely; one of its equal edged will then xxxxxx fall into vertical, and the other into horizontal position; and the xxxxx remaining edge, into one forming an angle of 45 degrees with the horizon; on this edge are two sights. (Remark: my instrument has two additional sighting devices on one of the other sides) through which (from ground nearly on a level with the foot of the tree) the observer must look towards its top, advancing or retiring till the sights point exactly to it; mark the place where he stands. Measure from it to a point perpendicularly below the object sighted: add the height of his own eye from the ground; and the sum is the height of the tree. The little instrument, which is designated Atkinson's Hypsometer, is very handy for finding the height of arches, pillars, towers, &c, Newcastle, Sept, 1872."
My search on the internet for the ATKINSON Hypsometer led me to two auctions in 2004 and 2010 in England, where this instrument was sold for 75 or 91 British Pounds and to a photo in a “DUNOTTAR COLLECTION”. See photo on the bottom of this page.

Here again a different combination: the operator's manual glued as in my device (only readable on the head when you open up the case), but the instrument has only two sighting devices.

In one of the auctions I found a good photo that showed more significant differences:

- Only two sighting devices on the hypotenuse (no sights on the other sides)
- Text directly readable if you open the case.
- Shape of the triangle text does not match with the shape of the instrument (see the brighter imprint of the device)
- The pins for the finger have a different position (slightly below and slightly to the right) than on the other instruments. Possibly due to the additional weight of 3rd and 4th sights. See the comparison below.

However, I noticed herein that the position of the white spot is approximately in the position where the tips are attached to the unit. (But the tip does not hit the white spot, since the positioning of the glued operator's manual is not correct). See picture below.

Photo of the Atkinson from then “DUNOTTAR COLLECTION” right.
But here I saw an approach for my further considerations.
So I used my (limited) possibilities of a photomontage and “cut out the images”, “slightly enlarged”, “mirrored”, etc., until I came to the following results:
The “shrewd head”, who had omitted the white spot in the instructions, wanted to achieve the following:
NO DISTURBANCE OF THE TEXT IN THE OPERATION MANUAL THROUGH A HOLE IN THE PAPER CAUSED BY THE PINS!
But here his colleagues in the team, who also worked on the production of this instrument did not understand what he meant! They thwarted his plans.

THE IMPLEMENTATION INTO PRACTICE SHOULD BE MADE IN THIS WAY.
The following basic conditions for the hinged case with the hypsometer must be met:
1. When you open the case, the instrument must lie in the lower part (otherwise it falls out of the lid)
2. The operating instructions shall be readable, in the position in which the user opens the case.
3. The tip must hit the free field (white spot) in the text.

FOR THIS PURPOSE, THE FOLLOWING MODIFICATIONS SHOULD BE MADE:
1. Text should be written larger (intermediate line to headline omitted) to have the same size as the instrument.
2. Instrument should have to been inserted horizontally mirrored into the lower part of the case that it will match with the text when the case is closed.
3. Position of the tips should not be changed later. (as has been done in later produced instruments)

Only then the tip of the instrument would pierce in the white spot and will not influence the reading.

This would require the layout of the case shown below (photo montage):

In practice we find, unfortunately, only the versions shown below. In all these cases the white spot is not hit by the pin.
We know such situations in which holes are pierced in texts through parts of the instruments, for example, at the Bergische Münzwaagen (Bergische coin scales), as my friend Ulrich Biber told me. It was done nearly correct in these examples below.

In GOOGLE BOOKS I found the information below about this instrument, one from a reader of a book 1879 and the other from the inventor himself:

...and information about Frederick Robson
At the end one mystery is left: why did they stamp on the lid of the box M. H. ATKINSON and not the name of the inventor Geo. C. Atkinson?
3. THE PATENTED CHRISTEN HYP SOMETER 1891

Recently my friend Ulrich Biber bought a simple instrument not knowing what it was used for. He asked me for more information.

The instrument is 33.5 cm long and 2.2 (2.8) cm wide.

The scale is marked non-linear with numbers (in meter).

We only found some words printed on it:

LATTE = POLE 4 meter long

I found references in the www:

PFISTER & STREIT, mathematical and physical workshops in BERN, capital of SWITZERLAND

This instrument is a tree height measuring instrument, called hypsometer.

It was invented in 1891 by Traugott CHRISTEN, from Bümplitz near Bern, Switzerland:

Patent 3568 May 1896 (see original patent below)

The instrument is delivered in a canvas sheath with an instruction.

Fig. 19: Use of the Christen hypsometer (from Stoetzer 1898)

Fig. 19 from the original instruction
This instrument consists of a metal strip 16 inches long (unfolded Swiss version 12 ½ inches), of shape shown in Fig. 51 (column right). The English/American version is made of two pieces hinged together, which are folded when it is not in use. A hole is pierced in the upper end, from which it is suspended between the fingers. Along the inner edge is a notched scale which gives directly the readings for heights. The instrument is used as follows:

A 10-foot pole (European version 4 meters=13-foot pole) is set against the tree. The observer stands at a convenient station whence he can see the tip and base of the tree and also the top of the 10-foot pole. The instrument is suspended before the eye and moved back and forth until the upper edge is in line of vision to the top of the tree and the lower edge in line of vision with the base. The point where the line of vision from the eye to the top of the 10-foot pole intersects the inner edge of the instrument indicates on the scale the height of the tree.

Each instrument is constructed for use with a specified length of pole. The instrument described above is one designed by the author for convenience with the use of English units. It was constructed in the following way: The distance be on the instrument was chosen arbitrarily as 15 inches and the length of the pole as feet. It would, of course, be possible to construct an instrument for a pole 12 feet or any other length and on a basis of a desired length of instrument. The theory of the construction of the instrument may be shown by Fig. 52. When used above described, two pairs of similar triangles are formed: \( \triangle ABC \) and \( \triangle ABC \); \( \triangle ADC \), and \( \triangle ADC \), in which \( \frac{BC}{DC} = \frac{de}{ef} \) and \( \frac{BC}{DC} = \frac{bc}{bd} \).

With a known value of \( DC = \) and \( be = dc \) may be determined for different heights which are likely to be required. Thus it may be assumed that it would not be necessary to measure trees less than 20 feet high, so that the lowest graduation on the instrument made for that height. To find the proper point for the 20-ft graduation on the scale, the following formula was used:

\[
\frac{BC}{DC} = \frac{be}{de} = \frac{20}{15} = \frac{150}{20} = 5.7 \text{ inches.}
\]

Below the text from FOREST MENSURATION NEW YORK 1921: here the instrument is folded.
PATENTSCHRIFT

Patent Nr. 35588
11. Mai 1891, 4 Uhr, p., Klasse 60

TRAUGOTT CHRISTEN, in BÜMPLIZ bei Bern.

Höhenmaßstab zum Messen von Bäumen.

Der Höhenmaßstab dient zur Bestimmung von Baumhöhen. Er besteht aus einem flachen Metallstab, der oben und unten zwecksam mit einem als Dioptrien dienenden Vorsprung versehen ist und eine Einheit trägt, an welcher mit Hilfe einer Latte von bestimmter Länge oder einer in entsprechender Höhe an Baume angebrachten Marke direkt die Baumhöhe abgelesen werden kann.

Sein Prinzip ist folgendes:

Sei $AB$ der Stamm, dessen Höhe gesucht werden soll, $CD$ ein senkrecht hängender Metallstab in solcher Lage, dass das obere Ende $C$ in der Visirlinie $OA$, das untere $D$ in der Visirlinie $OB$ liegt. $BF$ sei eine von dem Baume stehende Latte oder die Höhe der am Baume angebrachten Marken über dem Boden, $E$ der Punkt, wendum gegenüber das Auge des Beobachters $O$ das obere Ende der Latte $F$ sieht. Man hat dann die Proportion

$$\frac{BF}{EF} = \frac{CD}{AB}$$

woraus $AB = \frac{CD \cdot BF}{EF}$

Für unser Instrumente ist beispielsweise $CD = 30$ cm, $BF$, die Latte, gleich 4 m. Bestimmt man nun für alle häufigeren Höhen die zugehörige Distanz $E$ aus

$$E = \frac{CD \cdot BF}{AB} \text{ (hier } 1 \approx 0.8)$$

berechnete Massstab unter Anwendung einer 2 m langen Latte benutzt, so ist das abzulesende Resultat noch durch zwei zu dividieren.

Die wesentlichen Vorteile dieser Art Messung sind folgende:

1. Das Instrument besteht aus einem einfachen Stab, der sehr leicht mitzuführen ist;
2. Es gestattet eine direkte Ablesung der Baumhöhen;
3. Es macht die Messung einer Standlinie unnötig, was auf stellen oder mit Unterwuchs bewachsenem Terrain besonders nicht zu unterschätzen ist;
4. Der Gebrauch eines Stativs ist ebenfalls unnötig;
5. Es verlangt nur rasche Bestimmung nur eines Gehüls; die übrigen gehüblichen Höhenmesser deren zwölf;
6. Er erlaubt auch eine Höhenermittlung ohne Gehüls und ohne Stange, wenn man die ganze Länge des Massstabs, die in unserem Beispiel 33,33 cm beträgt, z. B. sechs Mal aufträgt und in dieser Höhe mit dem Baumreisser oder dergleichen eine deutliche horizontale Krebe macht und diese dann am oberen Ende ansieht.

PATEKT-ABDRUCK:

Der Höhenmaßstab zum Messen von Bäumen besteht aus einem leichten, flachen Stab aus Metall oder anderen geeigneten Material, an welchem sich eine Leihablung befindet, die mit Hilfe einer, an dem zu messenden Baume aufgestellten Latte von bekannter Länge, oder einer am Stamme in bekannter Höhe angebrachten Marken direkt die Höhe des betreffenden Baumes angibt, ohne dass eine Standline gemessen zu werden braucht.

TRAUGOTT CHRISTEN.
4. THE FAUSTMANN MIRROR
HYPSOMETER 1854 update

The basic information of the FAUSTMANN mirror hypsometer you will find on my web site on subpage “Faustmann mirror hypsometer” with the direct link: http://www.plumbbobcollectors.info/60822.html or in my newsletter 2009-04.

The first drawing of the mirror hypsometer from a newspaper 1856

Original Faustmann hypsometer produced by Martin Faustmann and his wife in the 1860s from my collection.

Recently I could buy from a seller in Beaufort, South Carolina a Faustmann mirror hypsometer made by Keuffel & Esser K&E in NY.

It was THE FIRST AND ONLY instrument that I saw after 5 years searching for an American made mirror hypsometer. When YOU have such an instrument in your collection, please let me know.

I knew that K&E offered that instrument between 1905 and the 1930s in the catalogues in two versions: one from BRASS and one with a WOODEN body. See drawings below.
On the front it is marked with the company name and on the back the former owner burned his name in. The seller told me: “The original owner was the dean of forestry at New York College.”

The instrument was sold in a black cardboard case. The button is marked with the company name.

My plumb bob has another (better) shape than the simple cylindrical lead plumb bob shown in the catalogue. So it seems to be younger.

Also the position of the “garage” is different: In the catalogue the “garage” is on the left side and on my instrument on the right side.

The two vertical (distance) scales are marked as follows:

II 4 to 20 (for the horizontal height scale A) and 25 to 100 (for the horizontal height scale B) and
I from 20 to 35 (for scale A) and
From 100 to 175 (for scale B)

The numbers on the horizontal (height) scale are printed mirrored. That is necessary that the user can read the numbers in the mirror correctly.
NEUHÖFER & SOHN maker of a reproduction of the Faustmann mirror hypsometer in WIEN, AUSTRIA
The instruments of this manufacturer are identified by
• A special hinge (screw)
• A cross hair instead of hair line

The reproduction of the original Faustmann hypsometer by Neußhöfer & Son could be between 1872 (change from foot to meter) and the 1925s (End of the business)

There exist a lot of company markings on the hypsometers. I try to bring them into a chronological order.

No maker name, but typical “Neußhöfer”

Without the street address

This first shop address in the 1st district of Wien is mentioned since the 1860s also for the predecessor company Joseph Neußhöfer. Wien I. Kohlmarkt 8

In 1905 Neußhöfer moved the shop from the 1st district to the 5th: WIEN, V. Hartmannsgasse 5. Near to the factory in WIEN, V. Schlossgasse 1.
Other instrument with similar font, but without name and address hat an instruction with the address Hartmannsgasse 5:

Other font, not so squiggled (estimation 1910s)

This instrument (without Neußhöfer name) was used in an Austrian forestry school until it was closed in the 1980s

5. SOMETHING TO SMILE ABOUT
Could be a sign for the room with your collection of plumb bobs.

6. REMARKS
This is an article of the monthly published WOLF’S PLUMB BOB NEWS that is sent on demand as PDF-file attachment by email. FREE.
You can see all former publications on the website www.plumbbobcollectors.info
On subpage “download publications” or on page “WHAT’S NEW?”
Remarks and contact by email: plumbbobwolf@t-online.de
Enjoy it
Wolf
Ps. For the members of our group the whole world turns around the plumb bob as shown in our logo right.