Theodor Scheimpflug

the life and work of the man who gave us *that* rule

By Jos Erdkamp

Translated by John Marriage

Some readers will be familiar with the "Scheimpflug condition". In simple terms this says that as you tilt the back of the camera, the plane of sharp focus also tilts. When you do this the imaginary planes through the back, the lens board and the object meet together on one line. Many think that Theodor Scheimpflug discovered this law, but in fact it has been attached to his name because he promoted it strongly. His main work was in aerial cartography, for which the Scheimpflug rule is a vital tool.

SO, MANY PHOTOGRAPHERS know the Scheimpflug rule and at some point have had to use it, but who is aware of the life and work of the person who gave it its name? Not many, which is unfortunate because Theodor Scheimpflug was a pioneer. As it is just over a hundred years ago that he died (on the 22nd of August 1911) this seems an appropriate moment to find out a little bit more about him.

Theodor Scheimpflug on 1st May 1888.

Introduction - that Rule

This article is about much more than Scheimpflug's Rule, but we can't really write about him without saying something about it first. So here is a short explanation in his own words:

"it is well known that the plane of the original and the first principal plane of the system of lenses, as also the plane of the projection image and the second principal plane of the system of lenses intersect each other in optically conjugate straight lines." (British Patent No. 1196 of 1904).

As he says, it was already known. Scheimpflug refers to a patent by Jules Carpentier from Paris for his special enlarger (British Patent No. 1139 of 1901), "Improvements in Enlarging or like Cameras." Carpentier says there that photographic negatives of tall buildings generally suffer from distortion of vertical lines that converge towards the top. This distortion may be corrected by using an enlarger to print the image which has the ability to simultaneously tilt the angles of the negative and the print in relation to the optical axis of the lens. Carpentier was also not the discoverer of the rule, he only built a device that made use of it; who the true inventor was, is not known.

So the rule is named after Scheimpflug because of his extensive studies and publications in the field.

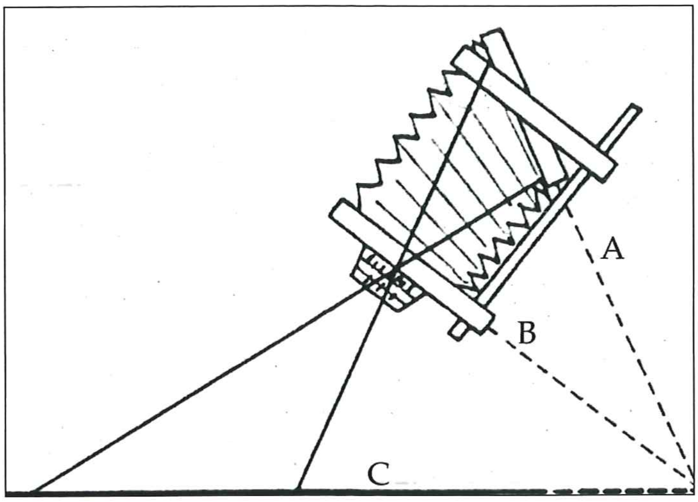
What can you do with the rule? It is typically used in product photography, where a number of separate objects on a tabletop need all to be in focus, and in architectural photography where the whole of an oblique façade must be shown in focus. It requires a camera whose lens board and/or film plane can be tilted. Field cameras, from antique to modern, and modern technical cameras, are usually equipped with these settings.

Youth and service in the Navy (1865-1896)

Theodor Scheimpflug was born in Vienna on October 7th 1865 as the third son of Joseph Scheimpflug (1829-1899) and Ernestine von Sarenbach Rinna (1831-1906). He found himself in a comfortable family. His father Joseph came from a merchant family and was a founder and first director of the Allgemeine Credit Bank in Vienna. Mother Ernestine was a scion of the Austrian nobility. The affluence of the family would be important later in Theodor's life, as we shall see.

Theodor had two older brothers, Karl (1856-1944) and Max (1858-1930) and two sisters. Marianne and Martha. Both brothers would go on to college and careers, and both would also have a special role in Theodor's career. About the life of his sisters I am not aware.

From 1875 to 1879 young Theodor attended the first four classes of the Akademisches Gymnasium in Vienna, then in 1879 he started a career in the Navy by attending the Naval Academy in Fiume (now Rijeka). In the fourth grade what turned out to be a major event took place: Professor E. Mayer, his practi-



Schematic representation of the 'Scheimpflug condition" as used in photography. A is the film plane, B is the plane passing through the lens and C the plane of sharp focus through the object. The three lines intersect in the drawing in the bottom right corner.

cal geometry teacher, was in the habit of visiting a café after the school day with his students, where he talked about topics beyond the standard curriculum. One evening he elaborated on the new science of photogrammetry, and how it could replace cumbersome point-by-point measurement of the landscape. However, the calculation of the data for a real aerial map was still a very laborious arithmetical process. Theodor realised that this could be made easier still if the calculations could be replaced by a mathematical-optical-mechanical process.

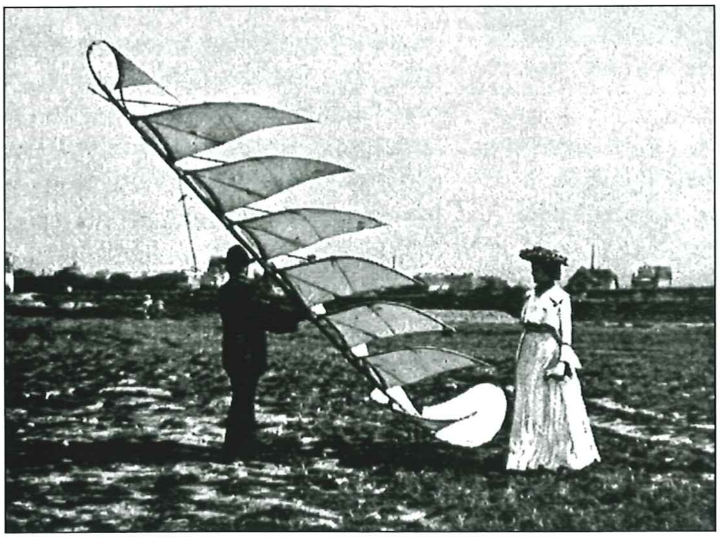
He never let this idea go, which led Theodor Scheimpflug to earn his spurs in the field of aerial cartography. He had no interest in ordinary photography, such as buildings, street scenes and the like. His life's work consists of developing a practical method and associated tools to make maps based on aerial photographs. In his own words: "The author has always had the goal in mind that the map is to be itself a kind of photographic landscape."

With his graduation on July 1, 1883 as a Cadet in the Navy he left the Naval Academy, and after several years of active service at sea was appointed as an officer in 1887. He then worked at the Naval Observatory in Pola (now Pula) and in 1894 was promoted to captain in the merchant marine. However, a diary entry at the end of 1894 shows that he had other plans for the future. He had two options: hydrographer, or engineer in the navy. In the years 1895-1896 Theodor took leave and went to study at the Business Academy and the Technical University, both in Vienna. At the technical college he attended in addition to general subjects also photochemistry, photogrammetry, mathematics, mechanics, higher geodesy, astronomy, optics, meteorology, geology, geometry, physics and drawing.

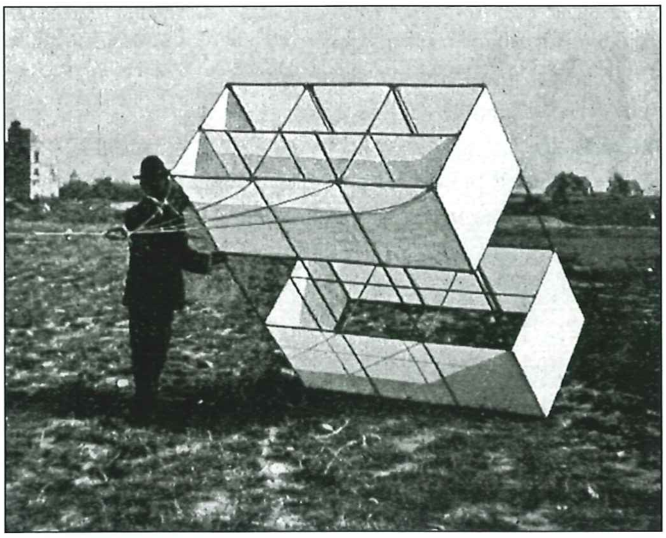
The preparation for his life's work (1896-1901)

In February 1896, Theodor became acquainted with Eduard Dolezal, his photogrammetry teacher. Dolezal involved Scheimpflug in photogrammetric measurements of monumental churches, including St. Leopold in Gersthof. Both men were keen to participate in the photogrammetric measurement programme of the Wiener Militairgeographisches Institut (Vienna military geographical Institute) and were invited by them to join an expedition in the summer of 1897.

For making the measurements they took along with them two other photogrammetric experts, Major Baron Hubl and F. Pichler. They spent some time in the Baumbach hut in the Julian Alps (now Zlatorog hut near the village of Lugo in Slovenia). During their stay there Dolezal persuaded Scheimpflug to give a lecture at a symposium for naturalists and physicists, that would take place in September 1897. Until then Theodor

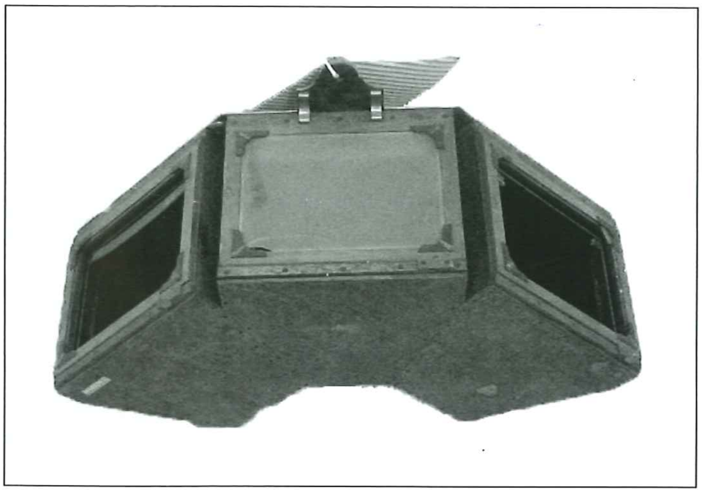


A Nikel kite that Theodor experimented with for several years. It is probably Scheimpflug himself depicted here, or an assistant. For many of his test flights he was accompanied by admirer Emmy Neumann.



A kite of the Marvin type that Theodor also used. The expensive 8-lens panoramic camera was mounted between the rods of the frame.

had not publicly shared his progressive ideas, although he had filed a sealed document in 1896 with the Kaiserliche Akademie der Wissenschaften (Royal Scientific Academy) in Vienna, to record his priority on the idea of photographic maps and the method to achieve them. During the conference in September 1897 Theodor spoke for the first time publicly about his ideas in the lecture entitled "On the use of the Skioptikon for making plans and maps from photographs."



This panoramic assembly consists of three separate cameras and was designed for the mapping of coastlines. The unit is on display in the Technical Museum Vienna.

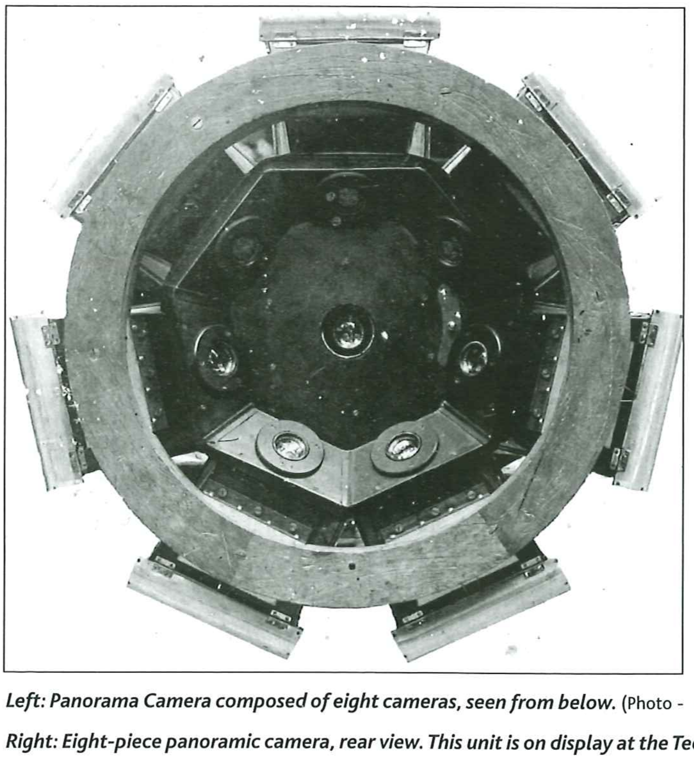
He said that he had been preoccupied since 1883 with the question "If it is possible to use the light that conjured the images of the outside world in an incredibly short time onto the photographic plate, can we also thus produce maps and plans directly in an optical way from the photographs?" His proposal was enthusiastically received, which encouraged him to further develop his concepts.

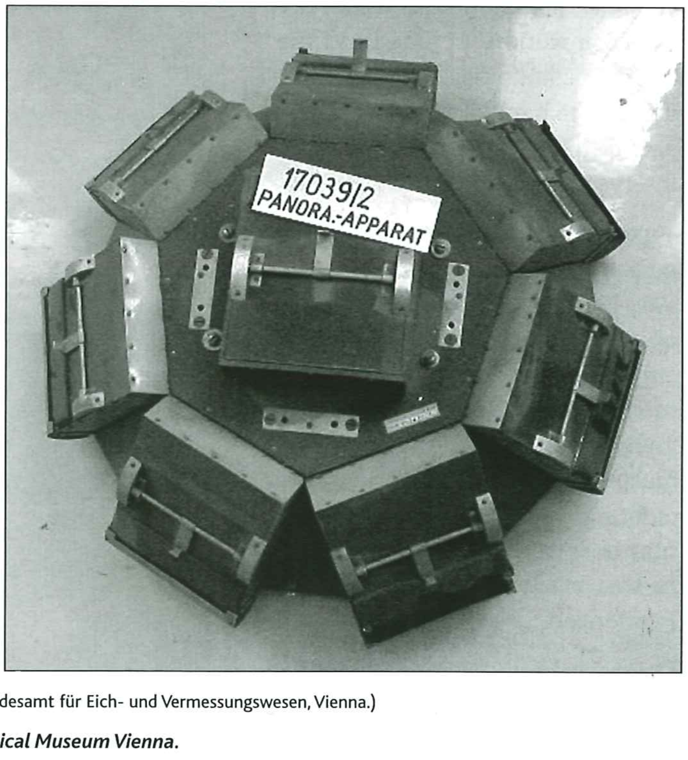
Dolezal persuaded Scheimpflug that the development would cost a lot of money for equipment and experiments, which could only be performed by a large institution. Therefore Theodor should seek to join the Wiener Militargeographisches Institut. This worked, and on December 1, 1897 he began a one-year trial.

Scheimpflug's stay at the Institute was not an unqualified success. In 1899 Theodor finally achieved a permanent post in the Institute, but that appointment was accompanied by a transfer from the Navy to the Army. Unfortunately, he was devoted heart and soul to the Navy and could not stomach this reassignment, for which his consent was not even asked. Carl Peucker said in an article of 1913 that this incident was the start of Scheimpflug's suspicious isolation and withdrawal from social life.

Furthermore, the expectation with which Theodor had joined the Institute, the ability to carry out costly experiments and investigations, had not materialised. He found no one who was willing to finance his research and equipment. At his own expense he was already engaged in the development of kites and special panoramic cameras, but because he did not have sufficient financial means he borrowed money from his brothers and sisters.

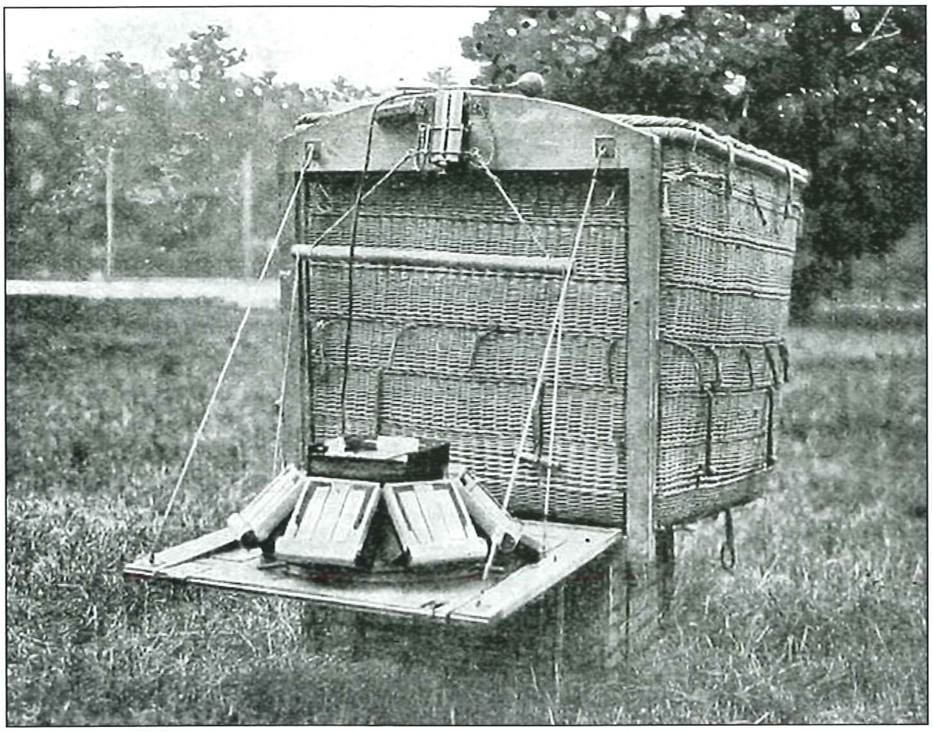
On a fateful day in 1899 he was working on a test flight just outside Vienna, near the Türkenschanz Park, when in a rapidly developing thunderstorm his kite carrying a 7-lens camera crashed. It was a loss of 3,000 Austrian-Hungarian guilders, a considerable capital sum at that time. It





Left: Panorama Camera composed of eight cameras, seen from below. (Photo - Bundesamt für Eich- und Vermessungswesen, Vienna.)

Right: Eight-piece panoramic camera, rear view. This unit is on display at the Technical Museum Vienna.



Balloon mounting: The eight-lens panorama camera is suspended in a special construction so that the device was kept as horizontal as possible during flight, and the plates could be changed. Date unknown.

brought him into a precarious financial situation and he was headed for bankruptcy.

A difficult character

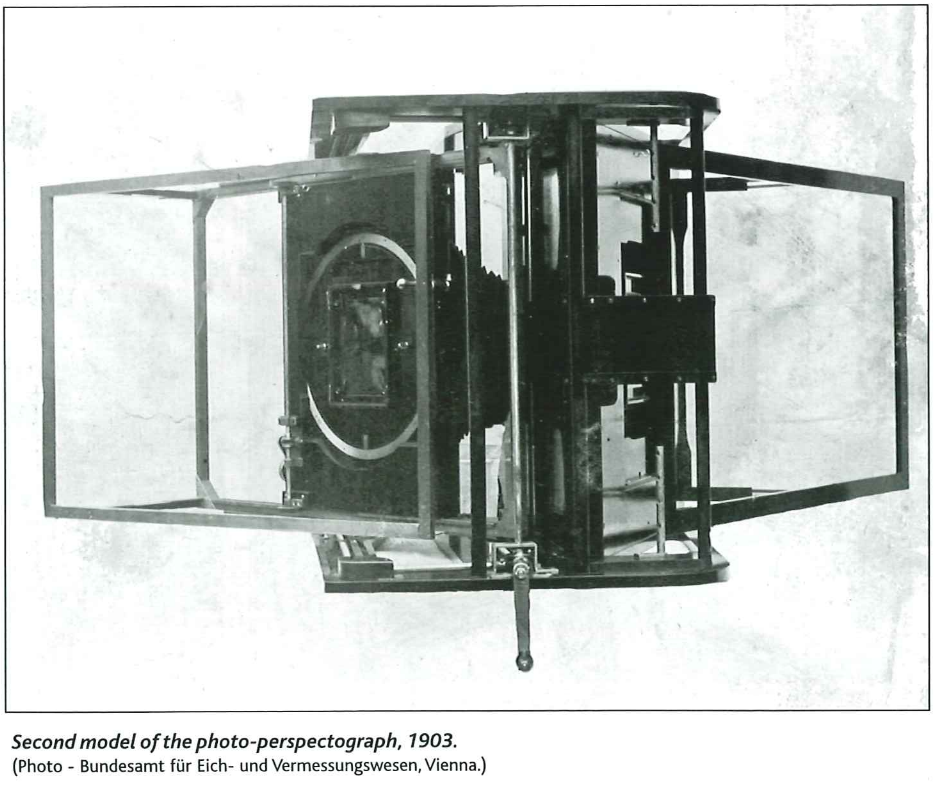
Why his life did not go as he had expected or hoped is hard to trace. Besides bad luck with the kite, his character played a role. From the available sources we get a mixed picture: he was intelligent, educated, versatile, popular and considered a good companion. At the same time he could sometimes be arrogant and difficult to handle and ignored any part of his work in which he had no interest. Mayer writes in 1994:

"According to the assessments of his military superiors (over the years 1899-1901) he was a well-qualified officer, yet his personality was difficult and contradictory. He was very intelligent and ambitious and had many interests. On the one hand he mastered five languages, was proficient in fencing and diving, and popular in society, but on the other hand he was as vain as a peacock and easily offended."

Dolezal said in the memorial collection of 1955 on his time at the Wiener Militargeographisches Institut: "... His self-confident and dogmatic nature, a sense of intellectual superiority, led again and again to differences with his superiors." The misunderstandings in later years made Scheimpflug very bitter, although some of it was self-inflicted. Dolezal noticed in the early 1920s that: "The inventor's innate distrust hampered him in all his creative work - his secretiveness meant that you never knew what he was really working on when he asked for theoretical advice."

In private correspondence from 1989, Dr. Erwin Weihs writes "He was admired and sometimes encouraged by his military superiors, but also envied and much hampered in his activities."

At the Institute things went from bad to worse. His 1899 assessment was full of praise and concluded that he was suitable for promotion to the First class; but in 1900 we find him "unfit for a leadership position and not eligible for promotion to the First class". The last years of the 19th century were not so good for Theodor. Financially he was at a low level, his relationship with colleagues and superiors was sometimes problematic, his military duties were only partially consistent with his interests, his studies were not supported and the relationship with his employer was soured by his involuntary transfer from the Navy to the Army. Not a nice situation if you are under 35. Then, something happened that would be of great importance - on July 23, 1899 his father died.



Second model of the photo-perspectograph, 1903.
(Photo - Bundesamt für Eich- und Vermessungswesen, Vienna.)

The years as an independent researcher (1901-1911)

As I have said Theodor came from a wealthy family. After the death of his father he inherited capital that not only saved him from financial ruin, but actually made him independent so that at last he could go his own way. In January 1901 he went on paid leave, and officially retired in 1904. He bought a large detached house on the Sternwartestrasse 39 in Vienna, established a workshop in the basement and could concentrate on the development of the three things he wanted to achieve:

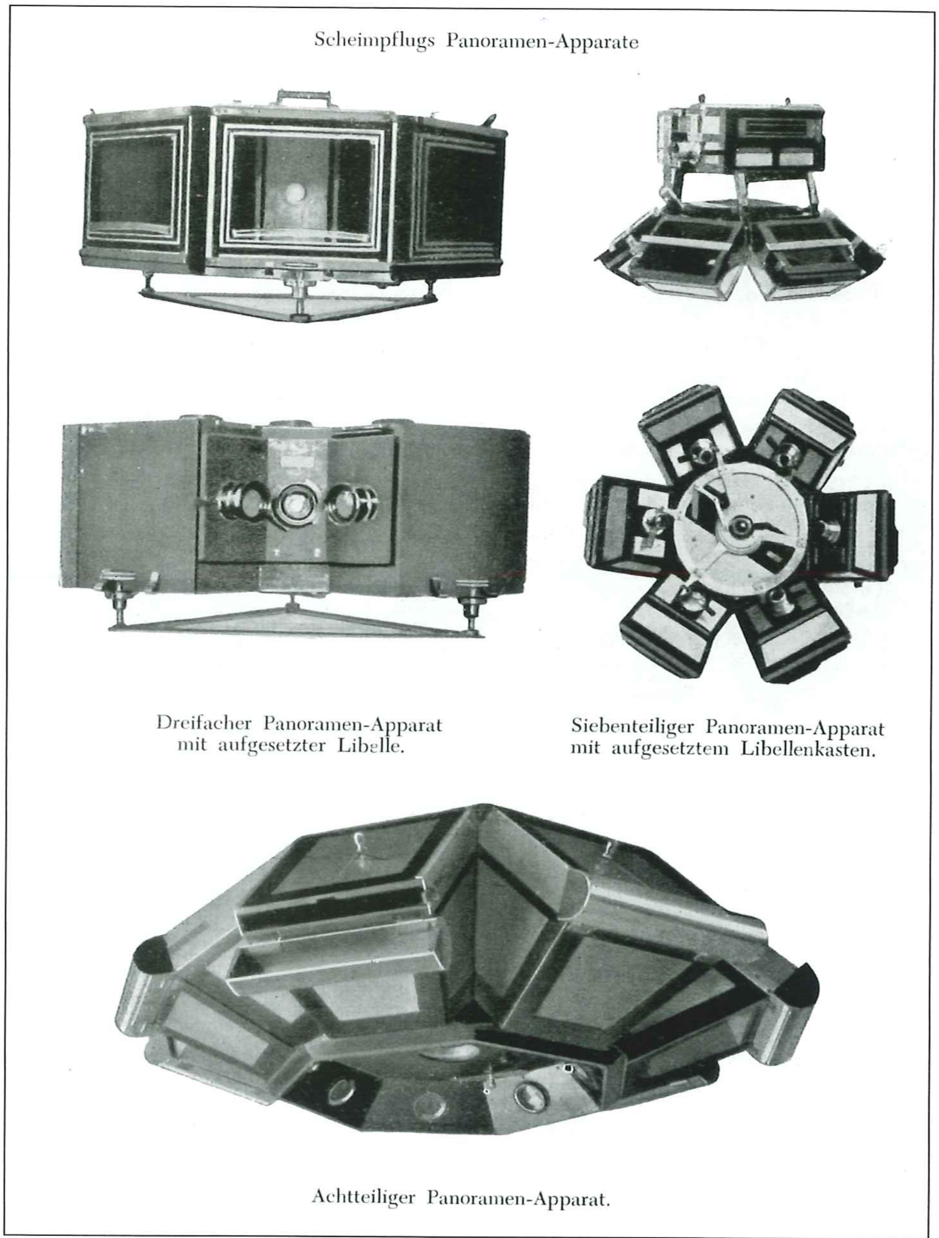
1. aerial photographs

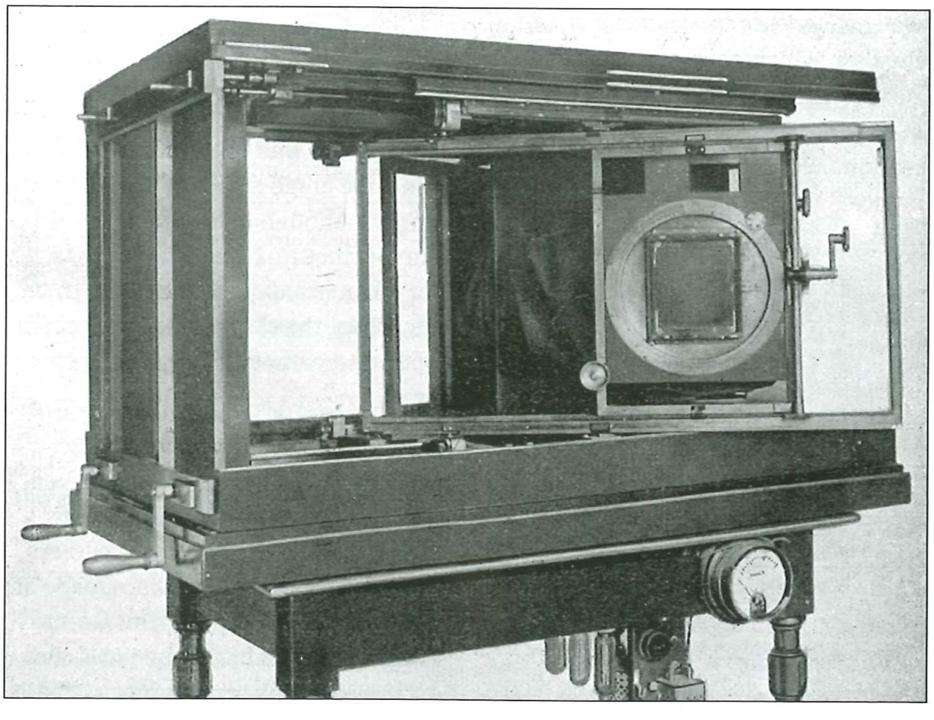
2. panoramic cameras

3. a device for correcting perspective distortion.

Photos from a great height

Engineer Gustav Kammerer, an important colleague of Scheimpflug from 1906 onwards, describes the benefit of aerial photographs in an article in December 1912 in the International Archives For Photogrammetry - "Terrestrial photogrammetry, which uses vertical plates, so to speak, gets perspective images, while the map needs to be





Above: Overview of Scheimpflug panoramic cameras.

Left: Fourth model of the photo-perspectograph, 1906.

flat. In such images usually not only is the foreground too large and detailed, the background appears far too small and poor in detail, but - and this is in principle much more serious - the foreground often hides large and important parts of the background. The higher the position, the freer the overview. One should therefore aim to photograph the terrain from the highest possible point."

At the end of the 19th century there were no aircraft, but there were balloons and kites. Balloons were expensive due to the costs of the hydrogen

A balloon flight with a Scheimpflug camera. In this picture you can clearly see the construction from which the camera was hung. To switch the plates during the flight, the device had to be rotated in the framework. Changing of the plates and returning the unit to position took about three minutes.
(Photo - Bundesamt für Eich- und Vermessungswesen, Vienna.)

gas with which the balloon was filled. Kites were a useful alternative and Theodor therefore continued to build kites in the workshop in the basement of his house. In his experiments with kites he had already received support from specialist flyer Hugo Ludwig Nikel, a soldier who also worked at the Militar Geographisches Institut. From 1901 to 1903 he again used Nikel and also financed his further studies with the so-called Nikel-fliers. In the workshop they worked on three types of Nikel kites, each with a surface area of six square meters, the largest that could be flown by one person. Type A was suitable for wind speeds up to 8 meters per second, type B to 12 m / s and type C to 20 m / s. The kites weighed around 4 kg.

After 1903 Theodor also experimented with box-kites of the Hargrave and Marvin type. The special camera was held within the framework of the flier, which gave a more stable result than attachment to a rope under the kite, and also provided protection during the landing of the device.

The cameras were electrically operated. The kites reached heights from several hundred meters to several kilometres. Theodor described his experiences in two publications - *Austrian Trials with Kite-Borne Cartographic Photograms and Results Thus Far* (1903) and *Using Kites at Sea* (1904).

Also in the *Book of Flight* by Hermann Hoernes in 1911, the author describes kites and aerial photography.

Cameras for large area recording

Special panorama cameras are needed for aerial surveying, for two reasons. Firstly, aerial photographs are only useful for the mapping when the orientation of the recording is precisely known. Here a distinction is made between the orientation of the camera, for example, the place where the optical axis of the objective cuts the recording surface, and its placement in the total environment. Locations in the picture must be linked to the points in the web of triangulation laid by surveyors. To do this as efficiently as possible shots of the widest possible areas are needed. This required a special panoramic camera.

Secondly, stereo recordings can be processed for the determination of the contour lines. This is only possible if the same points in the photographed landscape are visible in at least two shots. This means that the two photos should have at least 50% overlap. Scheimpflug learned from his experiences that an overlap of 80% is preferable. As a result, each new photograph adds only about 20% to the total record. In order to compensate for this disadvantage, Theodor wanted the greatest possible area in each picture.

For the panoramic camera there were two possibilities - a single big plate, or a multi-lens camera that took multiple pictures at once. The first option was impractical because the wide angle lenses of the day were not fast enough to allow a short exposure, something that was necessary for a camera dangling high up in the air. Thus, the choice was the second option - a composite panorama camera.

The first device that Theodor constructed consisted of a central camera pointing downwards and six cameras around the central camera, with which recordings were made at an angle of 45 degrees. This 7-lens camera was destroyed by the storm in 1899 and was replaced by a 20 kilogram device with 8 lenses. The focal length of the lenses was 90 mm. The recordings made with this unit had a total angle of view of about 136 degrees, which means that from 900 metres an area of 16 square kilometres can be photographed in one go.

In theory the central camera, when looking straight down, produced photographs of correct perspective, but in practice this was virtually impossible because the device was attached to a kite or balloon, and seldom hung horizontally. Furthermore, the surrounding cameras at an angle of 45 degrees always photographed images with perspective distortion. I quote again from Kammerer:

"Both photographs and maps are flat projective images of the countryside; they differ only in that in general, each element of the photograph is of a different scale than the corresponding element of the map. It should therefore be possible, through processes that eliminate these differences of scale, to convert the photographs into maps. He [Scheimpflug] discovered in the study of relationships, the laws of projective transformation and built his own enlargers (Photo-perspectographs), which can perform this transformation."

The required correction of the perspective is to enlarge the farthest piece of the landscape proportional to its distance relative to the nearest part. In the British patent No. 1196 of 1904, Theodor formulates the famous "Scheimpflug condition" which defines when the perspective will be correct. Basically, this consists of three parts:

1.The plane of the original photograph that has to be corrected

2.The plane through the lens

3.The plane of the ground-glass or the light-sensitive plate onto which the compensated image was projected

The lens must be located between the two other planes and all three axes of the planes must meet at one point.

The implementation of the apparatus was much more complex than the above suggests.

Perspectograph cameras - a summary

A Photo-perspectograph "camera" is a device which processes the original aerial photograph(s), in such a way as to cancel out or compensate the fact that the scale of the original image decreases in proportion to the distance from the camera. In other words it is a distorting enlarger or printing machine, employing Scheimpflug's Rule to place all the elements of the scene in the correct proportional size, in the positions that they would occupy on a conventional map. Thus a map can then be made directly from the corrected prints.

Model I, 1902

A relatively simple construction using two mutually perpendicular walls of a box with a movable lens in between these walls. The box was 60 inches long, 40 in width and 42 high. The negative had a size of 13 x 13 cm, and could be shifted in two directions with respect to the plane of the wall. The ground-glass in the other wall was 26 x 34 cm in size and could be replaced by a light-sensitive plate. After that the exposure is carried out. The unit had its limitations, for example, the small margin of the magnitude, so Theodor soon built a new device.

Model II, 1903

With this device, the angle between one plane (either original or enlargement) and lens is fixed at 25 degrees. The other face could be set between 25 and 55 degrees. With a gear and screw arrangement mutual relations between the surfaces were set so that the focus was automatically maintained. Original and ground glass both had a size of 13 x 18 cm and the focal length of the lens was 120 mm.

Model III, 1903

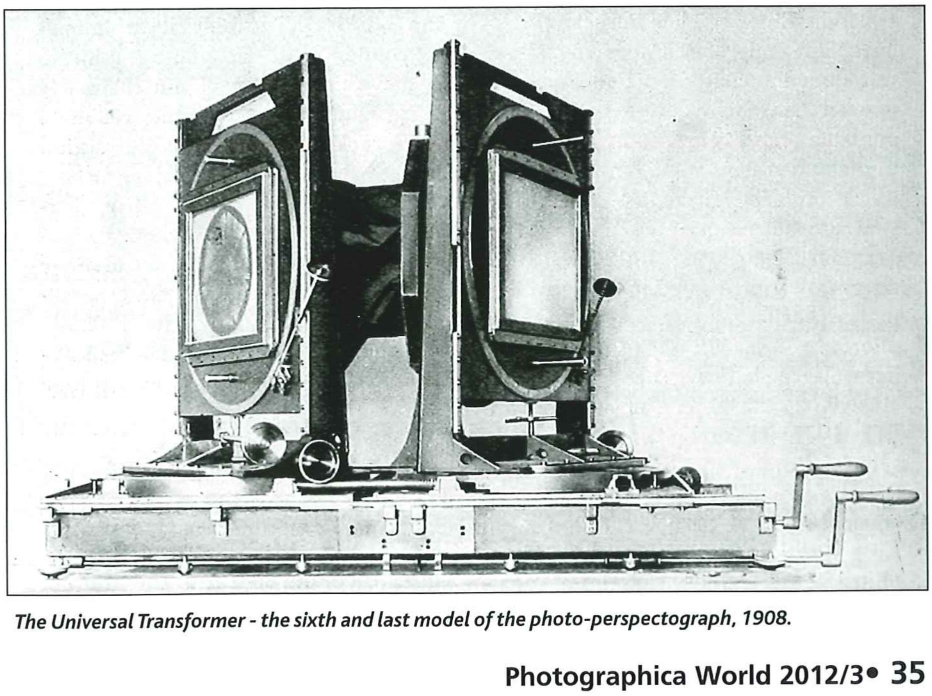
The fixed angle of 25 degrees in model II was found too restrictive, so in model III both angles between the three controlling planes were made variable. Again, focus was automatically maintained.

Model IV, 1906

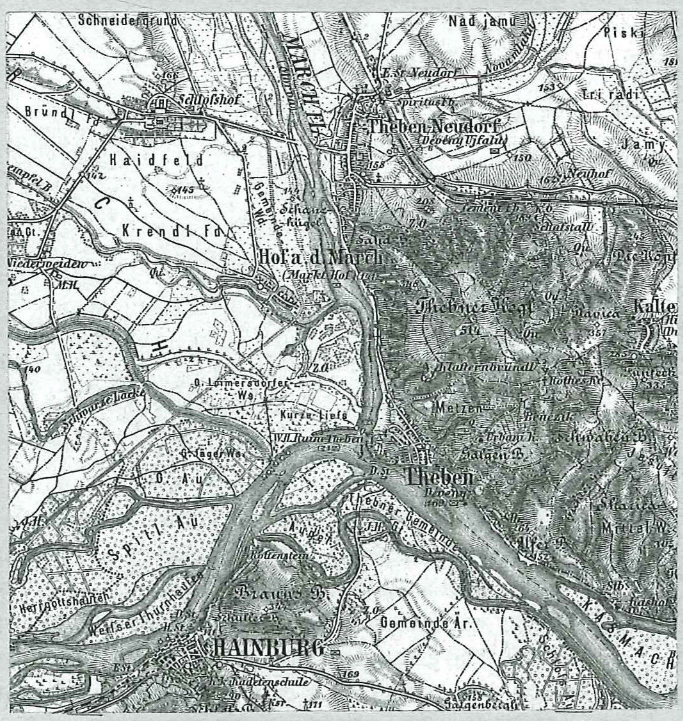
Variant of model III.

Model V

Previous models had a physical pivot point where the three planes of original, lens and print met. This worked well for photos that were made obliquely downward and showed a lot of perspective distortion, but did not work in almost straight down shots where only a marginal adjustment was needed, and therefore the pivot point had to lie a great distance away. With model V Theodor built a



The Universal Transformer - the sixth and last model of the photo-perspectograph, 1908.



Top left: an original recording of one of the cameras in the eight-part panorama camera. The recording has distorted perspective (the further distance is pictured smaller).

Top right: the same image corrected using a photo-perspectograph. All the elements in the recording are now to the same scale.

Above centre: the map of the area.

(Photo - Technisches Museum Vienna.)

device that functioned without a fixed pivot point, whilst the "Scheimpflug condition" was still respected. The disadvantage of this device was that the enlargement of substantially perpendicular recorded images was equal to 1 - that is, no real enlargement could be made.

Model VI, 1908

This so-called universal transformer was fully adjustable, so that enlargements could be made at both large and small angles between the planes. Moreover, the negativecould be rotated and displaced in its plane. This instrument was developed in collaboration with Gustav Theodor Kammerer (Hungarian patent 77167. 1917). The dimensions of the universal transformer were 110 x 50 x 80 cm. After Scheimpflug's death the unit remained in his collection until 1928, when it was sold to Professor A. Tichy of the University of Agriculture in Brno. The school was later incorporated into the Mendel University in Brno.

The balloon flights

In the first years of the 20th century Theodor had realized the conditions necessary to make maps from aerial photographs - the panoramic camera plus the photo-perspectograph. He was ready to publish his method, and the apparatus was subject to stringent testing. From kite photographs he took the step to shooting from balloons. It took until 1907 before balloon flights could be made. In the flights the camera was in an adjustable framework hung next to the basket. The crew could pull the camera up to change the plates and also adjust the panoramic device to the best possible horizontal position.

The first of three flights took place on May 22, 1907 and lasted 5 hours and 15 minutes. The flight was aimed at testing the camera, and gaining experience including the aperture, the exposure time and the plate type. On 13 September 1907 he took a balloon in the air for the second time. This flight lasted 5 hours and 45 minutes and served to test the horizontal positioning of the camera plus the operations in the balloon basket. During this flight 20 images were taken, each of 8 photos. Between each series of recordings of 8 photos there was a delay of 3 minutes, the time required for changing the 8 plates and the approximate levelling of the downward-looking camera. The speed of the balloon was so great during the second flight, however, that such a large distance has been made between the different exposures that the successive images failed to overlap sufficiently. The third flight of September 25, 1907 lasted 3 hours and yielded 20 usable recordings.

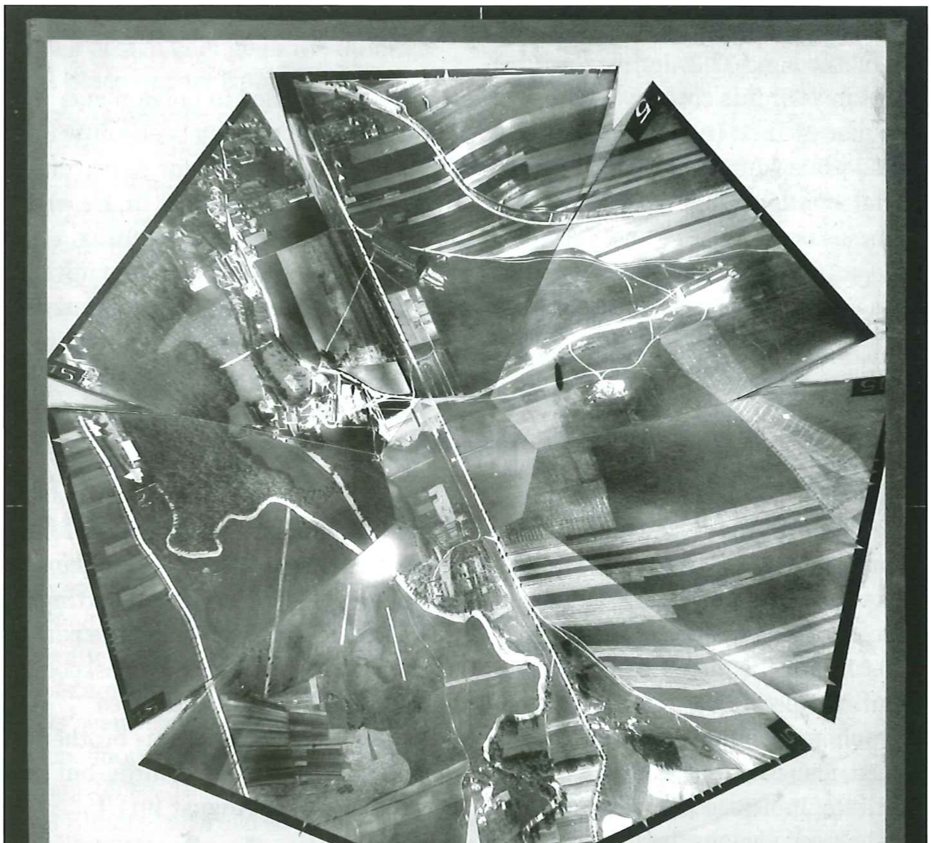
The stereo-comparator

Scheimpflug realized that contours could be deduced from his aerial shots, and therefore stereometric data had to be processed. To this end in summer 1907 he bought a Zeiss stereo comparator. By overlapping images in this viewer, it was possible to generate map contours. Processing the balloon images with the stereo comparator showed that the eight-part perspective and corrected composite aerial photographs were not sufficiently precise. However, including a clearer visualization of the measurement markings in the panoramic camera should lead to greater accuracy in the processing of individual photos of the 8-lens camera. Kammerer says it thus - "His thorough tests proved such accuracy of illustration by light rays that only a better correction of measuring marks in the camera could do justice to this accuracy. Inconsistencies in the recorded frames do not result from distortion in the lenses, but from insufficiently precise knowledge of the 'constants' of the panorama apparatus. From this it can be concluded that the mutual position of all images of panoramic apparatus can be known, if measuring marks are included in the pictures. These marks represent in photogrammetry, the equivalent of the 'crosshairs, threads or lines' in ordinary geodesic instruments."

Initially these plates with measurement markings (presumably engraved glass) were built into the covers of the plate holders and they were not in contact with the photo plate. In an improved version markings were in contact with the emulsion layer, so that their images on the photographs were much sharper, so the accuracy increased.

In the improved camera, the plates with measurement markings were permanently installed, so that a single calibration was sufficient. This calibration was performed by training the panoramic camera at night on the sky to shoot the stars. The relative positions of the stars were known exactly, so that the necessary corrections could be determined and shims could be made to fine-tune the photo-perspectograph. The eight photos of the recording could now be correctly aligned and a highly accurate and reliable representation of the landscape was obtained.

Theodor had now realised the three conditions necessary for aerial cartography - a method of taking aerial photographs using kites and balloons, panoramic cameras that made overlapping recordings, and a universal transformer with which perspectival images were converted to the horizontal plane. It was time to apply the invention in practice.



The eight sub-images from the panoramic camera, perspective corrected and merged into a panorama with a recording angle of approximately 140 degrees. The image is so detailed that separate stacks of hay can be distinguished.

Austria was not the place to do that well. The Austrian army was very reluctant, but abroad there were places more open to Scheimpflug's methods. His work was also now being recognized in aviation and photographic circles,. In 1907 the Wiener Photographischen Gesellschaft (the Vienna Photographic Society) awarded him their silver medal, and at the Voigtländer photographic exhibition in Dresden in 1907 he received the great honour award. In 1909 he received the Gold Medal for Merit at the Austrian Aeronautical Exhibition in Linz.

Scheimpflug in later life.
(Photo - Bundesamt für Eich- und Vermessungswesen, Vienna.)

Following his lecture *"On the technical and economic opportunities for extended colonial surveying"* at the first International Aeronautical Exhibition in Frankfurt in 1909, Brazil showed interest in his method and Theodor made plans to visit this country in the summer of 1911. In Belgium he garnered praise during the first international aviation conference in Brussels on 26 and 27 May 1911.

Success up for grabs

After years of hard work and major investment, success seemed to be within reach. Theodor was ready. He worked out that he could start with an initial capacity of 1500 balloon panoramas per year. At a recording height of 1000 metres an area of approximately 15,000 square kilometres would be covered, and could be processed into maps at a scale of 1:10,000. For the purpose of implementing this the Institut für Aerophotogrammetrie was established, also called Scheimpflug Institute. It offered pictures, map production, various devices built for sale, and last but not least, the research continued.

Sanatorium and death

From the aviation conference in Brussels on 26 and May 27, 1911 Theodor travelled to London and Paris. He had already been suffering a nasal inflammation for some time, and went back to Vienna ill. He was in the tertiary stage of syphilis, a disease he had contracted during his voyages, and he also suffered a neglected kidney disease. After returning to Vienna he was admitted to the sanatorium belonging to his brother Max in Vorderbrühl.

This private hospital had been established in 1894 and had room for 20 to 30 patients, who were able to recover or be treated in a luxurious setting. The sanatorium was in a large park with residence areas, terraces, pools and the latest medical devices. Theodor was nursed in his brother's sanatorium for a few months, but he died there on 22 August 1911.

The Scheimpflug Institute

The Scheimpflug Institute was officially established after his death by his brother Karl. Under the scientific leadership of Gustav Kammerer they began making a number of aerial photographs, for example in Pullach near Munich, the Belpberg in Berne and Gelsenkirchen in the Ruhr area. A demonstration flight was made for a Mexican commission on August 10, 1913 at Wanne near the Dutch border. In the autumn of 1913 they were also working at Cuffie and Pierrefonds in France. The Scheimpflug Institute also built instruments, partly in cooperation with Ernemann in Dresden. Just before the start of the First World War even the British government bought an aero set, consisting of a camera with suspension and a perspectograph. Unfortunately, the success of the Institute did not last long. On June 20, 1914, Ludwig Kammerer and eight soldiers were in a balloon flight at Fischamend. A careless pilot collided with the airship, which crashed killing all on board. After Kammerer's death the Institute went downhill and it was increasingly limited just to the preservation of Theodor's scientific legacy.

Eight days after Kammerer died, Crown Prince Franz Ferdinand and his wife were shot in Sarajevo, triggering the start of the First World War. During the war years technical development raced ahead, including in the field of aviation and aerial photography. Only then did the inventions and developments of Theodor Scheimpflug receive the attention they deserved.

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Sources: http://www.kodaksefke.eu/scheimpflug-file.html