A new practical and economical technique for the obtention of high quality thin section photographs with the help of a simple optical microscope *Vortrag*

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Microscopic study is an indispensable step in the determination of the petrographic characteristics of rocks. In Cameroon just like in most developing countries, simple polarizing microscopes of the 20th Century constitute the only available material for macroscopic studies. A major difficulty encountered in the use of these instruments resides in the realisation of photographs of the different parts of the thin section that require illustrations. The technique that has been used upto now has been inefficient and unsatisfactory. Faced with this recurrent situation, we thought of setting up a new, semi-modern, practical and very economical technique for photographing the thin section.

The setup that has existed till present day consists of an 'Euromex' microscope with eyepiece fixation plates (removable eyepiece plate). The principle consists of removing the eyepiece plate and then fixing a second one which is specially conceived, for, it bears a metallic tube on which can easily be connected an argentic or classical camera, that is, using films. Once the camera is connected, the part of the thin sections to be filmed is carried out through a fastidious set up step of the image, for, it is the eye piece of the camera that is used rather than that of the camera; the zoom of the camera is fixed. Once the setup of the image is over, room light has to be eliminated so as to avoid any influence on the quality of the films. Moreover, the source of light of the microscope should neither be too low, nor too sharp, because on this factor strictly depends the quality of the photographs. All these problems suppose that, for the realisation of good quality photographs, it is better to proceed at night while putting off all room lights (electricity).

However, after having thoroughly respected all the above constraints and obligations related to light, it is very recurrent that after having realised the pictures, one still obtains empty negatives during the process of development. This is because the camera was unable to fix a single image. As a result, in order to increase the chances of obtaining images, several photographs are usually taken on one single section, while modifying the intensity of the light source after each film. With this technique, we succeeded in obtaining few images whose quality was highly denatured by light. The few images were then later on scanned so as to have a numerical version. It should however be noted here that due to the low resolution power of the scanner, the exact nature of the original photograph is no reproduced. Finally, mediocre to poor quality photographs are obtained.

This method, which is long, fastidious and expensive, is a serious obstacle in the progress of most research works of geologists in third world countries. This is because is not only a time consuming technique, but also a non-reassuring one. The final product is only lightly satisfactory. Because of the above constraints, it was necessary to revolution-

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ize the method.
Faced with the persisting difficulties, the establishment of a new technique of microscopic photography was then envisaged The setup is based on the polarizing microscope, a numerical camera and an adapter.

- the polarizing microscope can either monocular or binocular;
- the adapter is a hollow cylinder or a plastic cylinder whose diameter is greater than that of the objective of the numerical camera, with its hight varying between 3 and 5 cm. The adapter should also have a diameter which is slightly greater than or equal to that of the eyepiece of the microscope. The adapter plays the role of extension of the eyepiece thereby facilitating movements (translational movements) of the zoom (objective) of the camera.
- numerical cameras of all sorts can be used so long as their objectives have diameters which are close to that of the eyepiece of the polarizing microscopes.

The principle consists to:

- Place the thin section on the mineral plate and chose suitable sections to be filmed
- fix the adapter on the eyepiece of the polarizing microscope
- insert the zoom (objective) of the numerical camera inside the adapter
- Progressively move the camera so that the light source from the eyepiece of the microscope should passe inside the objective of the camera (coincide the objective of the camera with the eyepiece of the microscope.
- Once the previous step is properly done, the zone of the thin section to be filmed will be seen on the screen of the numerical camera. At this point in time, the zoom can be readjusted for the best quality photograph to be obtained.

The advantages are:

- the section to be filmed is visible on the screen of the camera;
- after filming, the photo is immediately observable and if its quality is not very good, it is possible to cancel the picture and to repeat the process on the same zone of the thin section;
- the pictures obtained are of very high quality and directly transferable to a computer without further scanning, as in the previous case, for the various manipulations. Moreover, with the aid of modern software programs, it is possible to improve the quality of those images in the computer.
- The method is relatively easier, faster and cheaper.

However, the only obstacle or inconvenience encountered in the new technique resides in the determination of the scale of the photographs. This is because it is difficult to determine the rate of enlargement or reduction of the camera's objective as well as that of the computer. In order to overcome the obstacle, the following steps have been proposed:

- On each section to be filmed, choose a given mineral, mark it

and measure its dimensions with the help of the graduations on the crossed nicols. The obtained value is termed initial dimension (D_i) or real dimension.

- After computer processing and printing of the photographs, the marked minerals are then measured again and the obtained value is termed final dimension (D_f).
- The scale of the photo is the ratio of the real dimension to the final dimension $E = D_i/D_f$

The proposed method enables to obtain high quality photographs, but, it however remains rudimentary, for it requires much skills and manipulations. Moreover, the polarizing microscope does not offer durable observations; it will be necessary to construct a more practical and less expensive microscope on which is incorporated a numerical camera that will meet up with the expectations of all. Thus, microscopic observations will be carried out for longer periods of time (because the light will no longer exhaust the eyes with time) and in groups, thus permitting constructive discussions.