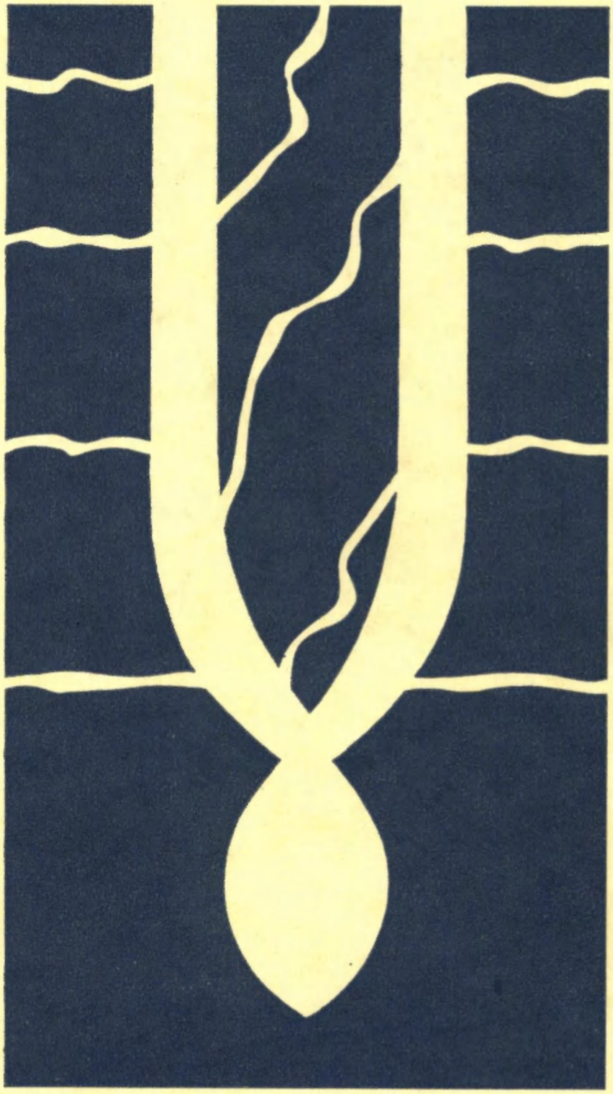
Survey Papers No. 2

COLLECTION AND PRESERVATION OF SOIL MONOLITHS



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SOIL SURVEY PAPERS No. 2

COLLECTION AND PRESERVATION OF MONOLITHS FROM SANDY SOILS AND RIPENED CLAY SOILS ABOVE AND BELOW THE WATER TABLE

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CONTENTS

SUMMARY

The field and indoor methods used now (spring 1965) by the Netherlands Soil Survey Institute are comprehensively described in an illustrated paper. Developed mainly from data published by other authors and partly from own experience, the methods show as novel aspects:

1. in sandy soils a high water table need not prevent the use of the field method, provided wellpoint dewatering is applied to drain the profile,
2. application of Saran-netting in the field enables collection within one day,
3. with the aid of rack and pinion jacks and a tackle monoliths of 120 × 80 × 10 centimetres can be collected in galvanized metal boxes for indoor preservation,
4. mounting on particled board instead of hardboard makes monoliths less vulnerable,
5. natural colours of sandy soil monoliths are restored by pouring out a mixture of 25 vol. % vinylite resin, 50 vol. % aceton and 25 vol. % methyl-isobutyl-ketone on them.

1. INTRODUCTION

From the time on that man began to intensify his study of pedological processes the need arose to record and preserve them as true to nature as possible. Especially for instruction and demonstration clear examples of the subject matter are needed. That's why in the course of time many methods have been tried to achieve this.

The first to be mentioned are water colours of the soil (MÜCKENHAUSEN, 1962) demanding great craftsmanship and even greater artistic talent for their execution. Not many scientists will be so gifted that they can actually paint clear pictures of certain pedological phenomena. Though this method of reproduction may be very instructive, it will never be entirely equal to reality. There are important phenomena that are just visible with the naked eye — e.g. very fine sedimentary stratifications, the finer parts of macropores, etc. — but that can only be reproduced in a exaggerated way in a water colour. The picture will not be true to nature then.

A second method is photography. For many years black-and-white photographs have been used and more recently colour-photography has improved and consequently become popular. Especially the latter has many possibilities. Details stand out more clearly and the colours are hardly different from reality any more. It can be said that colour-photography has become an indispensable method to illustrate a number of pedological phenomena.

For educational purposes a third method of demonstration is available, allowing us to illustrate the spoken word by using the natural material itself. As man is to a high degree adjusted to visual perception, this form of teaching by illustration is the most effective. For that reason much attention has been given throughout the years to the use of the material itself for demonstration purposes and many methods to achieve this have been proposed.

According to KUBIËNA (1953) an iron box with sharp edges was designed by RISPOLOSHENSKY as early as 1897 with the purpose to collect soil monoliths, and in 1922 VILENSKY published a nearly identical method. Neither method uses a preservative so that the monoliths did not keep well.

In a paper of SCHLACHT published in 1929, mention is made of the so-called "Klebeplattenmonolithmethode". In this method a piece of thick cardboard is covered with a brush with an adhesive and then pressed against the wall of the profile pit that has been made smooth beforehand. After drying, the soil particles adhere to the cardboard. However, this method is suited to sandy soils and very light clay soils only.

MC CLURE and CONVERSE (1940) preserve prepared monoliths with carpenters glue. A similar method is described by BERGER and MUCKENHIRN (1946) but a vinylite resin is used for preservation.

Nitro-cellulose lacquer is widely used as a preservative. VOIGT used it as early as 1936, whereas GRAČANIN and JANEKOVIĆ published a method based on nitro-cellulose lacquer in 1940. Around 1945 this was in general use apart from minor alterations in the Netherlands too.

Note. A Dutch version of this paper will be published in Boor en Spade XV.

2. TOOLS AND MATERIALS

Soil profiles may be preserved either in the profile pit or in the laboratory. The field method is applied to all sandy soils and light clay soils at a low water table. Sandy soils with a water table reaching into a part of the profile that has to be preserved are also processed by the field method provided the water table has been lowered by wellpoint dewatering. The indoor method is applied to light clay soils with a high water table and to all heavy clay soils. The monoliths are collected in metal boxes from profile pits, taken indoors and preserved after drying for a certain time. Small as well as big metal boxes are used. Small monoliths, weighing 40 to 60 kgs (88 to 110 lbs) can be collected by one man. For the big monoliths with a weight of 250 to 300 kgs (550 to 600 lbs) two men, and heavier equipment, are needed (see 4.2).

2.1. **Tools and Materials for the Field Method**

flat spade and measuring tape,
profile lacquer (nitro-cellulose lacquer) and thinner,*)
can with spout of about 1 litre (1 quart),
saran netting of 1 mm meshes and nails for fastening,
a pair of pruning scissors, knife and broad, flat painting brush,
piece of hardboard, a few centimetres larger than the final size of the monolith,
piece of particled board 8 to 12 mms ($^{3}/_{8}$ to $^{1}/_{2}$") thick and of the same size as the piece of hardboard.

2.2. **Tools and Materials for the Indoor Method**

a. For the Collection of Small Monoliths:

flat spade and measuring tape,
galvanized metal box, 100 or 120 × 25 × 8 cms (40 or 48 × 10 × $3^{1}/_{4}$"),
hammer, 2 kgs ($4^{1}/_{2}$ lbs),
drawing knife having a blade longer than the width of the box (see fig. 1),
cutting spade with ball peen reinforcement (see fig. 2).

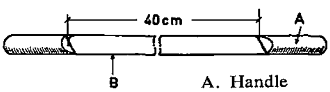

Fig. 1. Drawing knife to cut the monolith in the box level

A. Handle
B. Blade

b. For the Collection of Big Monoliths:

flat spade and measuring tape,
galvanized metal box, 120 × 80 × 10 cms (48 × 32 × 4") (see fig. 3),
3 rack and pinion jacks and wooden beams for propping,
thin steel wire rope (dia. 1 mm = No 18 SWG or AWG),
tackle (see fig. 18),
2 steel channel sections, 200 × 5 × 5 cms (80 × 2 × 2"),
soil auger, length 125 cms (49"),

*) Lacquer and thinner used are products of Messrs Pieter Schoen N.V., Zaandam, Holland.

steel tube, length 100 cms (40″), outer diameter the same as that of the soil auger and fitted with a steel ring to attach the tackle (see fig. 18),
steel tube of the same diameter, length 250 cms (100″), fitted with a fixed pulley on one end (see fig. 18).

c. For the Preservation of Monoliths:

flat spade,
profile lacquer (nitro-cellulose lacquer) and thinner,
can with spout of about 1 litre (1 quart; see fig. 4),
saran netting, 1 mm meshes,
knife and broad, flat paint brush,
piece of hardboard,
piece of particled board, 8 to 12 mms ($^3/_8$ to $^1/_2$″) thick,
wooden hammer.

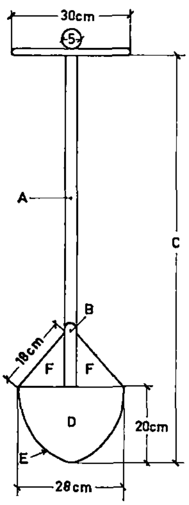

Fig. 2. Cutting spade with ball peen head

A. Massive iron bar (dia. 2½ cms = 1″)
B. Transition into the blade, forged flat
C. Total length 10 cms (4″) longer than the metal box
D. Blade made of 3 mm (11 gauge) steel plate
E. Sharpened edge
F. Reinforcement with triangular steel plates

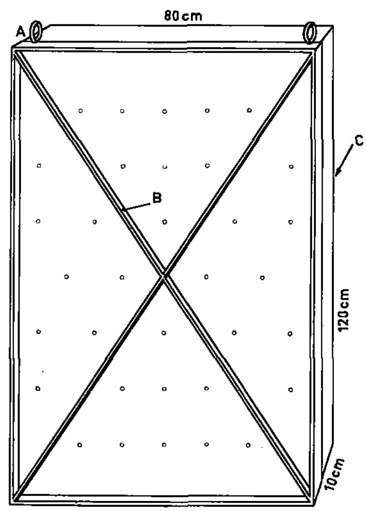

Fig. 3. Metal sampling box

A. Steel eyes
B. Welded-on strips for reinforcement (20 × 7 mms = ¾ × ¼″)
C. Sharpened edges

3. THE FIELD METHOD

3.1. Procedure for sandy soils (< 8 % clay) with low water table

3.1.1. **Preparation of the wall of the excavation.** It is necessary that the wall of the profile pit from which the film is collected has a slightly backward slant — c. 10° from the perpendicular — and an absolutely smooth surface. The slant is necessary to obtain an even downflow of the lacquer and smoothness to obtain a uniform thickness of the film. Above all small pits in the surface should be avoided because the lacquer, when flowing over them, will detach itself from the surface of the soil and form pellicles. resulting in bare spots where no soil adheres to the film.

3.1.2. **Preparation of the lacquer.** When the wall of the excavation has been smoothed the lacquer can be put on. The aim is to make the layer as thin as possible maintaining nevertheless complete coverage. A thin film has the following advantages:

- Having a low weight, it can be loosened from the wall with greater ease and less hazard of breakage.
- Micro-stratification and evidence of biological activity (homogenization) are shown more clearly with thin films than with thick ones.

The quality, and especially the porosity of the profile to be conserved determines at what viscosity the lacquer should be applied. The coarser the sand, the higher the viscosity of the lacquer has to be, for a thin lacquer would penetrate too deeply into so porous a material. For these profiles the lacquer can very well be used undiluted, as delivered by the manufacturer (c. 17 poise) even at rather low temperatures.

A profile consisting of very fine sand, or even containing loam, on the other hand should be treated with diluted lacquer (c. 10 poise). To obtain a film of sufficient strength it will however be necessary in most cases to apply a second layer, of higher viscosity, immediately after the first (diluted) layer has been poured on.

3.1.3. **Pouring-on the lacquer.** The lacquer is poured from the can onto the profile, starting at the top of the exposed wall. The can is moved regularly from left to right and vice versa covering the whole width. As the lacquer flows down the point of impact is lowered accordingly while keeping up the to and fro movement of the can (see fig. 4). Care should be taken to obtain an even downflow, with the front of the lacquer forming a straight horizontal line. This can be achieved by pouring with a good-sized jet. If the lacquer is poured on unevenly, it tends to flow down along a number of separate courses causing the front of the lacquer to become pointed. As more lacquer flows down these spikes than in between, it penetrates deeper into the soil, giving rise to irregular thickenings of the film which do not show to advantage.

For a similar reason a supply of lacquer of uniform viscosity, amply sufficient for the surface to be treated, should be prepared in advance. Otherwise additional quantities will have to be prepared at a moment's notice causing deviations in viscosity resulting in irregularities in film thickness.

When two thirds to three quarters of the surface are covered, pouring should be stopped. The rest of the surface will be covered by the continuing downflow of the lacquer; the higher the viscosity, the longer the pouring has to be continued.

After about one hour, depending on temperature, when the layer of lacquer has dried a little and shows a thin pellicle on its surface, the saran netting is stretched on and fixed with a few nails. A second layer of lacquer of the same viscotity is now poured

Fig. 4.
Pouring-on nitrocellulose lacquer

Photo: Neth. Soil Survey Inst. no. R 26-118

onto the saran netting. The main advantage of the use of saran netting, that the film can be collected after about 8 hours already, although the lacquer is at that time not yet wholly dry internally. Nevertheless the netting will support the film already to such an extent that it can be loosened from the bank. Lateron the netting will serve as a lasting reinforcement of the completed monolith.

However, the use of netting is not necessary provided one is willing to wait 18 to 24 hours before loosening the film. This means that one will have to return and collect the film the next day. When great distances are involved the additional travelling expenses may be considerable, not to mention the loss in time.

3.1.4. **Collection of the film.** Before collecting the film, the underside and the sides are cut free (see fig. 5) in such a manner that a true rectangle or square is formed. It is necessary to give some support to the film when taking it from the wall. A piece of board is pressed against the film and then the film is loosened at the top. With a strong knife the roots and rootlets, generally present in the upper 30 to 40 cms (12 to 16″)

Photo: Neth. Soil Survey Inst. no. R 26-121

Fig. 5. Cutting to size the monolith along a piece of hardboard before it is loosened from the wall

Photo: Neth. Soil Survey Inst. no. R 26-123

Fig. 6. Collecting the monolith, loosening the upper part

Fig. 7. While collecting the film has to be supported continuously

Photo: Neth. Soil Survey Inst. no. R 26-124

are cut, woody roots should be cut with pruning shears. If we simply pull the film from the wall, it may be possible that the roots tear holes into the film. A space of a few cms (1 of 2") should be maintained between the film and the knife or shears to avoid damage.

When a few centimetres of film have been loosened at the top they are pressed against the piece of board (see fig. 6). The piece of board and the film should be kept firmly together with one hand in order to prevent mutual shifting as much as possible. With the other hand the roots at greater depth are cut and in advancing the freed part of the film is pressed against the board.

When the rooted layer has been passed by, the film is pressed against the hardboard with both hands and the lower part of it is pulled loose from the wall. In reaching greater depth the whole is pulled slowly backwards while at the same time the piece of hardboard is pressed with the knee against that part of the film that has not yet come loose (see fig. 7). Care should be taken not to damage the film by bending it too sharply during loosening.

If there are in the lower part of the profile layers that tend to resist separation, they should not be cut but be pried loose with a knife at a safe distance from the film. In this manner damage to the normal way of rupturing along natural surfaces of weakness can be prevented. When the whole film has come off, it lies on the piece of hardboard.

3.1.5. **Mounting of the film.** The film is mounted on a piece of particled board, 5 cms (2") longer and wider than the film. With a flat brush a large amount of lacquer is applied to it (see fig. 8). The lacquer should be of the same viscosity as used for making the film. Supported by the piece of hardboard the film is now transferred to the piece of particled board by letting it slide onto the latter while gently pulling the piece of

Fig. 8. Applying nitro-cellulose lacquer onto the piece of particled board

Photo: Neth. Soil Survey Inst. no. R 26-125

hardboard sideways from underneath it (see fig. 9). Then the film is pressed down gently onto the particled board with the flat of the hand starting from the middle in a lateral direction (see fig. 10) until some lacquer comes out along the edges and a good bond is ensured. This lacquer has to be removed gently with a knife. To prevent creep during transportation the monolith has to be kept flat, as the lacquer takes 24 hours to dry thoroughly.

3.1.6. **Finishing the monolith.** As the top of the monolith has been cut loose at a fair distance from the exposed wall due to the presence of roots, the nonadhering soil material has to be removed from the dried film by prying the bulk of it loose with a knife, followed by gently tapping the back of the particled board with a wooden hammer at the topside of the profile. The remaining superfluous soil material can then be removed easily. After a final trimming of loose roots the monolith is finished.

After a short time, however, the natural (field moisture) colours begin to fade more or less, owing to the drying out of the monolith. The colour can be restored by repeatedly spraying the monolith, but not before it is sufficiently dry, with a mixture of two parts of fluid A and one part of fluid B; fluid A consisting of 8 vol. % vinylite resin dissolved in 92 vol. % acetone and fluid B consisting of 8 vol. % vinylite resin dissolved in 92 vol. % methyl-isobutyl-ketone (SMITH and MOODIE, 1947).

We found, however, that a single treatment with a mixture of 25 vol. % vinylite resin, 50 vol. % acetone and 25 vol. % methyl-isobutyl-ketone poured onto the monolith will serve the same purpose.

3.2. Procedure for sandy clay soils (8-25 % clay) with a low water table

The limits indicated for the clay content admissible for this procedure are tentative and are strongly influenced by the grade of structure *) of the soil. A clay content slightly surpassing 25 % is admissible, provided the soil consists of rather small aggregates (< 10 mm, equal to < 7/16") and has a strong grade of structure. The

*) The grade of structure depends on the durability of the aggregates (the strength of cohesion within the aggregates) on the one side, and on the force needed to separate the aggregates (the strength of adhesion between aggregates) on the other side. The highest grade of structure has maximum adhesion between primary parts and minimum adhesion between aggregates. Lower grades of structure have a lower ratio of these forces. When adhesion is homogenously distributed throughout the soil, the latter is called "structureless". Then, at the highest level of adhesion the soil will be coherent and of massive "structure", whereas the single grain "structure" of noncoherent, loose sand is the ultimate possibility at the low end of the scale (Soil Survey Manual, 1951, p. 229; JONGERIUS, 1957).

Fig. 9. Transferring the monolith to the prepared piece of particled board

Photo: Neth. Soil Survey Inst. no. R 26-126

Fig. 10. The monolith is gently pressed down with the flat of the hand

Photo: Neth. Soil Survey Inst. no. R 26-127 admissible clay content is, however, less than 25 % for soils having a weak grade of structure.

Generally speaking the adhesion between the soil and the lacquer has to be greater with sandy clay soils than with sandy soils because a higher resistance has to be overcome when the film is pulled from the bank. To enhance this adhesion we first pour on lacquer of low viscosity (c. 6 poise). Being thinner it can penetrate into profiles with a strong grade of structure along the natural fissures (planes of weakness) between the aggregates and into any pores that may be present. In massive soils penetration is restricted to the pores only as natural fissures are nearly absent. In addition the pores in these soils are mainly micropores (< 30 micron).

When the diluted lacquer has been poured on, a second layer is applied to the wall, this time consisting of lacquer of normal viscosity (c. 16 poise). With these soils saran netting has to be used. It is applied in the same manner as described in section 3.1.3 and here too we have to wait 8 hours before the film can be loosened from the wall.

This is done nearly in the same manner as described in section 3.1.4. In the case of these heavier soils, however, resistance in the lower part of the profile will be greater than in the case of sandy soils. Therefore we shall have to pry the soil loose with a knife not only in the rooted zone but also in the subsoil. The knife has to be kept a few cms. away from the film and in order to avoid damage to the natural planes of weakness, no cutting movements should be made.

The subsequent processing of the film is identical to that of sandy soils.

3.3. **Procedure for sandy soils (< 8 % clay) with a high water table**

In rapidly permeable sandy soils having a high water table a profile pit can in most cases not be excavated to a greater depth than the water table, because already during digging, the walls cave in under the pressure of the ground water.

In soils of slower permeability it may be possible to excavate to a greater depth, but after some time the walls of the pit will also cave in under the pressure of the ground water. To avoid this risk, the water table has to be lowered beforehand by wellpoint dewatering.

To begin with, a number of filter tubes of 2 metres or longer are brought into the soil around the site of the future profile pit. Number and length of the tubes depend on soil permeability. The tubes are connected with suction hoses to an engine-driven suction pump. A filter tube, inserted at the site of the pit, serves as gauge to keep track of the falling of the water table.

As soon as the predetermined depth has been reached the excavation of the pit may begin while the pumping continues. During excavation the water table goes on falling, with the result that all noncapillary pores of the soil are drained. Although soil moisture is still at field capacity then, the soil monolith can be collected and preserved by the same procedure as used for sandy soils with a deep water table and as it is described in section 3.1, because these soils have numerous noncapillary pores that can absorb lacquer (Gračanin and Janeković, 1940).

4. THE INDOOR METHOD

Whereas sandy soils with a low or a high water table and sandy clay soils with a low water table can be preserved on the spot, the field method cannot be applied to light clay soils with a high water table and to heavy clay soils, as the water held by the numerous capillary pores is retained with such strength that it cannot be removed by wellpoint dewatering within a reasonable time. Therefore monoliths from these soils are collected with the use of open-faced boxes of galvanized iron and preserved after having been brought indoors. Two sizes of boxes are used and as the methods and the necessary tools are different, the procedures are described separately.

4.1. **Collection of small monoliths**

When a good-sized profile pit has been excavated, the wall from which the monolith has to be collected is cut perpendicularly and smoothly. The box is placed with the open face against the wall with the top side level to the surface of the soil and then driven in with a hammer until the floor of the box touches the face of the soil profile (see fig. 11), as can be observed through the sparse perforations in the bottom.

Fig. 11. The metal box for collecting small monoliths is driven into the wall until the bottom touches the face of the profile

Photo: Neth. Soil Survey Inst. no. R 23-179

Fig. 12. Grooves are cut along the perpendicular sides of the box, going in 10 cms (4″) past the open face

Photo: Neth. Soil Survey Inst. no. R. 23-180

Photo: Neth. Soil Survey Inst. no. R 23-184

Fig. 13. When the cutting spade with ball peen head has been driven in, the monolith is loosened from the body of the soil by pulling the spade inward

Photo: Neth. Soil Survey Inst. no. R 23-185

Fig. 14. The severed monolith is cut level to the edges of the box with a drawing knife

Along both the lateral sides of the box grooves are dug c. 18 cms (7″) into the wall (see fig. 12). Then the cutting spade with ball peen head is placed on the soil surface at c. 5 cms (2″) from and parallel to the open face of the box and pushed down perpendicularly to a depth of c. 50 cms (20″). If necessary it may be driven in with the hammer. Then, standing up in the pit and pressing the knee against the bottom of the box, the spade is driven in further with the hammer until the point of the blade is below the underside of the box.

Now the box, with the soil in it, can be detached from the wall by pulling the ball peen in the direction of the pit (see fig. 13). The monolith, weighing 50 to 60 kgs (110 to 130 lbs) is lifted out of the pit and laid down flat. With a drawing knife the soil is cut level with the edges of the box (see fig. 14).

Finally the monolith is brought indoors for preservation. The field work, that can be done by one person, is then completed.

4.2. **Collection of big monoliths**

Big monoliths, having a size of 120 × 80 × 10 cms (48 × 32 × 4″) and weighing 200 to 300 kgs (440 to 660 lbs) can be collected by two men with the aid of a number of tools.

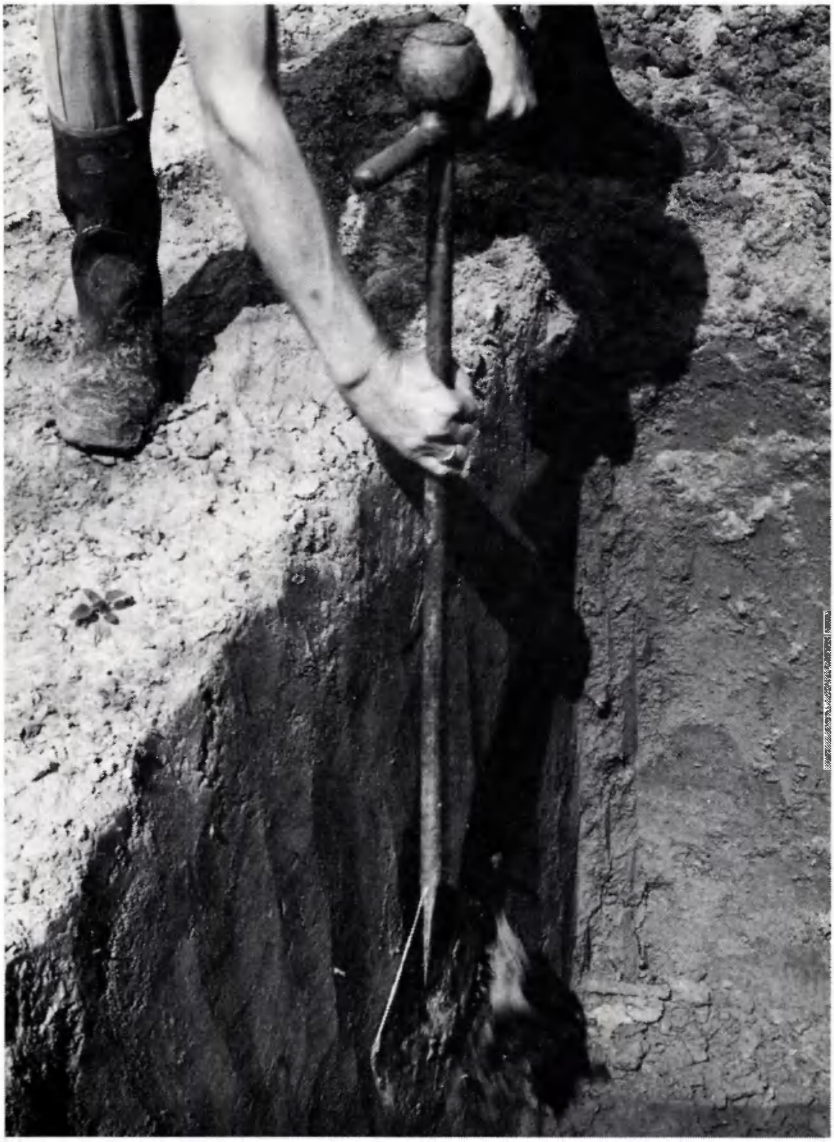

Photo: Neth. Soil Survey Inst. no. R 27-54

Fig. 15. Before taking a monolith the wall is cut perpendicularly and even

When the exposed wall has been cut smooth and perpendicular (see fig. 15) a metal box is pressed into the wall by the heads of three rack and pinion jacks, one below in a central position and two half-way up, at the edges; their feet resting on wooden beams propped against the opposite wall (see fig. 16). As soon as the floor of the box touches the face of the soil profile turning is stopped but the jacks are left in position to keep the box perpendicular and to prevent shifting.

Photo: Neth. Soil Survey Inst. no. R 27-57

Fig. 16. A collecting box for big monoliths can only be driven in uniformly with the aid of rack and pinion jacks

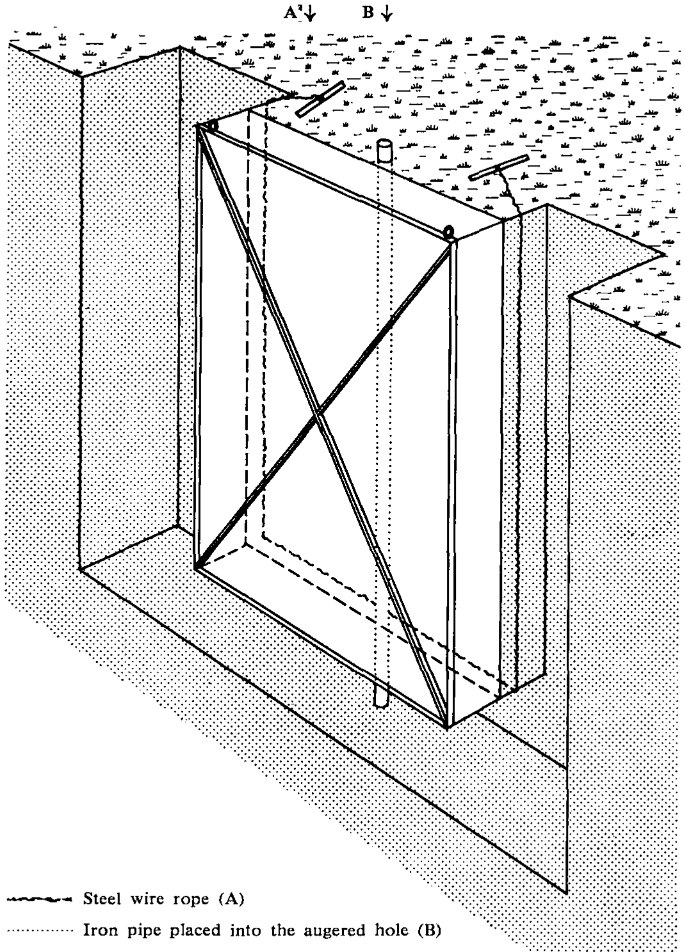

Fig. 17. "Sawing of" the monolith. An iron pipe has been placed between the sampling box and the steel wire rope to prevent the wire rope from cutting through the monolith

To the left, to the right and underneath the box grooves are cut 20 cms (8″) into the wall. Then a hole is augered at c. 8 cms (3¹/₄″) from the open face of the box, reaching from the surface into the groove underneath the box. To cut loose the monolith a thin wire rope (dia. 1 mm) is brought into the grooves surrounding the box until it lies c. 10 cms (4″) away from the open face of the box. An iron pipe is then inserted into the bored hole to prevent the wire rope from cutting through the monolith (see fig. 17).

After this the groove underneath the box is filled up tightly to prevent sagging and on the surface a groove is dug parallel to and 5 cms (2″) from the open face, to a depth of 25 cms (10″). The box is then "sawed" off by two men alternatingly pulling the wire rope. Although now severed from the body of the soil, it is kept in place by the jacks.

Now the upper half of the wall opposite the box is cut away slantwise and two steel channel sections are laid on it to serve as guide rails along which the box can be pulled out of the pit (see fig. 18).

Fig. 18. Arrangement of the hoisting apparatus needed to pull the filled box out of the profile pit. The wall opposite the monolith has been cut to form a slope on which two channel sections are laid Photo: Neth. Soil Survey Inst. no. R 27-64

A few metres (yards) away from the slant a hole is bored and the pipe with the steel eye is pushed down into it until the eye sticks out just far enough to attach the tackle. The long pipe with the fixed pulley is placed in between in such a way that a hoisting apparatus is formed.

When the cable of the tackle has been fastened to the eyes on the metal box the jacks are taken away, the box is gently tilted backwards until it comes to rest on the channel sections and then it is pulled out of the pit (see fig. 18).

Finally a station car or van is brought alongside, the box is pushed in over the channel sections with the jacks and taken along for indoor treatment.

4.3. **Indoor treatment**

For big as well as for small monoliths the method of preservation is equal. To begin with, the monolith is made smooth with a drawing knife or a flat spade. Since cellulose lacquer does not penetrate into the capillary pores of clay (GRAČANIN and JANEKOVIĆ, 1940) but merely adheres to the surfaces of the aggregates, the monolith is left to dry until small cracks form in the surface. This takes some time depending on the moisture content of the monolith and of the air; generally a few days will do.

After drying the box is placed with a backward slant of 10° against a wall and strongly diluted lacquer (c. 6 poise at 25° Centigrade), which easily penetrates into small cracks, is poured on.

Saran netting is then laid over this layer of lacquer and fastened along the edges with nails (see fig. 19). Now nearly undiluted lacquer (c. 12 poise) is poured on, embedding the saran netting.

After several days, when the lacquer has dried, the monolith is laid down horizontally and is cut loose from the sides of the box (see fig. 20). A piece of hardboard is pressed against the open face of the box and the monolith is turned over. The box is lifted from the monolith (see fig. 21) and the greater part of the superfluous soil is removed by prying it loose with a knife (see fig. 22).

The mounting is similar to the method for films described in section 3.1.5. A large quantity of lacquer is applied to a piece of particled board, a few cms larger in both directions. The monolith is then transferred by sliding it sideways from the hardboard onto the piece of particled board (see fig. 23). Then the monolith is pressed down firmly onto the piece of particled board and left undisturbed for a few days to give the lacquer time to set.

When the monolith has become firmly attached the piece of particled board is tapped gently on the backside with a wooden hammer (see fig. 24) to remove nonadhering soil particles. The natural structure of the soil will then show more clearly.

If desired the monolith can be put into a wooden frame with the name, origin and other data on it.

Fig. 19. When the lacquer has been poured on, the monolith is covered with saran netting and fastened with nails

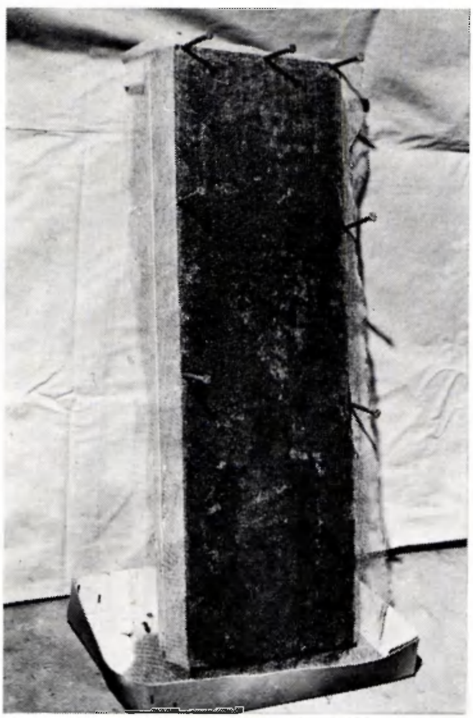

Photo: Neth. Soil Survey Inst. no. R 23-188

Fig. 20. Superfluous netting is cut away while loosening the soil along the inside edges of the box

Photo: Neth. Soil Survey Inst. no. R 23-190

Photo: Neth. Soil Survey Inst. no. R 23-191

Fig. 21. The box is lifted off the monolith that rests on a piece of hardboard

Fig. 22. Superfluous soil is removed

Photo: Neth. Soil Survey Inst. no. R 23-192

Photo: Neth. Soil Survey Inst. no. R 23-193

Fig. 23. Transferring the monolith to a piece of particled board, brushed over beforehand with lacquer

Fig. 24. Nonadhering soil is removed by tapping the backside of the piece of particled board with a wooden hammer

Photo: Neth. Soil Survey Inst. no. R 23-195

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