

Forged heavens or cast disk? An Augmentation to “Critical comments on the find complex of the so-called Nebra Sky Disk” (3 Sept. 2020)

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Research can only make progress through constructive criticism and appropriate improvements – and that was precisely the intention of our commentary. That is how science works.¹
Scott Williams, New York University

Introduction: Context and Objective

The introductory quote from another recent scientific discourse illustrates in a welcome way the basics and principles of good scientific work, to which the scientific community has pledged itself. Research can aim for advancement and achieve ultimate approach to the facts or historical reality only through constructive criticism and improvement. Through the critical analysis of the state of material and publications on the so-called Sky Disk of Nebra we have proceeded along this path; and at the same time have shown the dissatisfactory and insufficient state of affairs and publication of all scientific data (GEBHARD & KRAUSE, 2020). They do not build the basis to regard the so-called Sky Disk of Nebra together with the alleged accompanying finds as a closed find and with that as a hoard with several components. Until now the work group around H. Meller has always designated this collection of finds as a hoard, in order to gain a chronological anchor for the Sky Disk, which on its own cannot be easily dated. The fact that thereby the term of ‘closed find’ or the designation as ‘hoard’ has been applied quite unthinkingly until now shows the need for a closer look at the methodical basis of our field of Prehistoric Archaeology. In his fundamental study on methodology already in 1903 Oskar Montelius used of the expression ‘secure find’, emphasising that this term “*may be applied only to the sum of those objects, which were found under such conditions that they must be observed as deposited at the same time.*” (in the original: „Summe von denjenigen Gegenständen bezeichnet werden [kann], welche unter solchen Verhältnissen gefunden worden sind, dass sie als ganz gleichzeitig niedergelegt betrachtet werden müssen“) (MONTELIUS, 1903, 3).

This condition is certainly not the case with the find convolute, which allegedly stems from the Mittelberg near Nebra. The many open questions regarding the site or sites of the find’s discovery, the controversial versions of the history of the discovery, and the only very vague reasons for the unity of the find convolute do not allow the conclusion to be made that the disk was in association with a pair of swords, two axes, a chisel as well as ring jewellery, as part of an ensemble that was placed in the earth at one point in time. Until now we cannot recognise that the available publications present the necessary substantial and reliable verification of source.²

Seen against the background of this glaringly unsatisfactory situation, we suggest that the bronze disk should be separated from the other artefacts and questions about the discovery site and in further discussion observed as a single find. In view of an initial analysis of its iconography we – like other scientists before us (DAVID, 2010; GLEIRSCHER, 2007), – have come to the conclusion that the disk does not follow pictorial traditions of the Early and Middle Bronze Age. Instead, it correlates very well with the iconography of the Iron Age. With that the Sky Disk is approximately one thousand years younger in age and, thus, should be reconsidered and evaluated in a completely new cultural association.

On September 3, 2020, our article with a critical appraisal of the state of research and suggesting a new dating of the Sky Disk in the Iron Age was published. There was great resonance in the international press as well as numerous reactions.³ On the same day, in a news release appeared the immediate response from Dr. Alfred Reichenberger, representative of the state archaeologists and directors of public relations in the State Office for the Protection of Monuments and Archaeology in Sachsen-Anhalt – Museum of Prehistory. Two months later, on November 13, 2020, a counter-statement appeared, accompanied by another press release: in which an ‘all-clear signal’ was given, implying that the scientific ‘detective story’ was now solved and that the Sky Disk of Nebra would

clearly date to the Early Bronze Age.⁴ Named as contact partner or scientific committee – for the first time in association the Sky Disk from Nebra – was the Austrian Academy of Sciences (Österreichische Akademie der Wissenschaften) represented by Dr. B. Horejs, director of the Institute of Oriental and European Archaeology (Institut für Orientalische und Europäische Archäologie) and co-editor of the journal *Archaeologia Austriaca* (the journal in which the response of a group of 13 authors is presented in a lengthy study).⁵ This organ is seen as an international journal with peer review; its advisory board includes not only E. Pernicka, but also A. Busch of the Römisch-Germanische Zentralmuseum Mainz.⁶

This author-team of 13 research scholars involves mainly seven associates of the State Office for the Protection of Monuments and Archaeology in Sachsen-Anhalt – Museum of Prehistory in Halle, in addition to three members of the ‘old group’ in Halle – G. Borg, E. Pernicka and G. Bruggmann (the latter two from the Curt-Engelhorn-Center for Archaeometry, Mannheim). Hence, actually only three new associates can be named as authors: Th. Koiki, W. Kainz and Th. Stöllner.

A summarising view of the article issued by Pernicka et al. (2020) reveals that it does not contain new data or contents, which might contribute to answering the many open questions posed by us, but instead repeats foremost that which has long been known. Nonetheless, in a total of five places in the text regarding these existing monita, conclusory forthcoming publications are announced, for example about the still unpublished excavations conducted between 2002 and 2004 on the Mittelberg.⁷ Yet, from aforesaid article we also learn that there are not only two lead-isotope measurements of the Sky Disk, made in 2003 in Freiberg/Saxony, which were published by D. Nickel in a diploma thesis (NICKEL, 2003), but even more lead-isotope measurements – as of yet unknown and not published – carried out in 2007 in the Curt-Engelhorn-Center for Archaeometry, Mannheim (PERNICKA ET AL., 2020, 107 Fig. 21). Moreover, it provides a first-time complete X-ray image of the bronze disk (PERNICKA ET AL., 2020, 99 Fig. 11). This image offers the occasion for new considerations and discussions concerning the production process of the Sky Disk, and that has led to the title of the present article.

Given the unsatisfying facts and state of publication, as well as the ever-growing impression in our field of archaeology that only slivers of information are being issued at a time,⁸ the announcement by A. Reichenberger in November 24, 2020, in an interview with the *Mitteldeutscher Rundfunk*,

was quite confusing: There he stated that “for us it [this issue] has been put aside scientifically” (in the original: „Für uns ist es wissenschaftlich ad acta gelegt”),⁹ meaning that no further scientific and critical debate should follow.

Reichenberger’s statement might be understandable from the viewpoint of local newscasting, but it cannot end further critical and constructive scientific discussions concerning the find complex around the so-called Sky Disk of Nebra. Further discussions should include – among others – an explanation of the conditions at the discovery of the various individual finds: the bronze disk, the pair of swords, the chisel, the axes and the ring jewellery. Here there is an urgent demand for the publication of all data, which enable a comprehensible scientific reconstruction of the find circumstances, which is not only legitimate, but also to be expected within the framework of sound scientific practices. In view of the state of affairs and the highly emotional discussions, it seems purposeful, that the finds and their find context should be analysed anew by an independent group of international experts, and which should also include new geochemical and soil analyses. The state archaeologist H. Meller is against such an international investigation, referring to similar demands as “nonsense”, and noting that an international research team had already published several thousand pages on the issue.¹⁰

In order to emphasise the urgently needed continuation and expansion of the scientific discussion, in the following critical remarks to the aforementioned article by the aforementioned 13 authors of the study in *Archaeologia Austriaca*,¹¹ here we wish to provide the reader with information about our view of the actual state of research. This entails the questions: What progress has been made? What questions are still not resolved? Thereby, in a new discussion of well known arguments, reference to available analyses can be excluded.¹²

State of the source material

First of all, a brief account will be made of the source material itself, for which the 13 authors expressly take position: [cit.] “The authors of the study point out, that Gebhard and Krause argue using incomplete and partly incorrect or falsified data.”¹³ Yet, as an all-inclusive, final publication is still lacking – in particular, the excavation report, a catalogue of finds, a catalogue of analyses, the report on restorations, transcripts of the earliest meetings – until now scientific discussion finds

support only in the source material that is officially known. Important individual, specific data can only be drawn from the numerous articles and presentations, and thus until these desiderata are published, they remain somewhat vague. We have already referred to this issue in detail.¹⁴ Yet, the new publication in *Archaeologia Austriaca* does not solve this basic problem! Especially with regard to the history of the find, as well as to the early appearance of narratives whose message constantly changes, the oldest documented statements are indispensable for a critical analysis of source material.

The following presents an example of this aspect: It is undisputed that ultimately only the two finders of the Sky Disk can explicate the site and the find conditions. Initially the responsible persons were aware of this, too. Even though the site was declared “secure” („sicher“) following the excavation in 2002, in June 2003 A. Reichenberger emphasised that “Indications speak in favour that the disk stems from the Mittelberg. However, there is no 100-percent certainty. This can only be attained through the admission of the finders.”¹⁵ In the same newspaper article, one of the two finders, H. Westphal questioned: “What led everyone to think that I found the disk on the Mittelberg?” Only in 2005, three years after the excavation on the Mittelberg, did Westphal confirm the archaeologists’ preferred theory “Mittelberg” by preparing two sketches, both of which were obviously influenced by the assumptions of the archaeologists.¹⁶ The second finder, M. Renner, has contradicted the sketches to this day.¹⁷ The 13 authors of the study in *Archaeologia Austriaca* now imply that a uniform statement was made by both finders, shortly before the end of the court trial: “On 11 May 2005 Westphal prepared a sketch of the find situation ... in the presence of his lawyer and the second looter Renner, according to which the disc stood vertically in the ground, the boat at the lower edge, and the Pleiades at the top.”¹⁸ In verifying this new aspect and with regard to the original protocol (Fig. 1), apparently only one of the finders (Westphal) took part in the discussion of the sketch; no lawyer was present. The person accompanying Westphal was a friend, whom he referred to as his ‘manager’. In a second protocol, which was completed a few hours later, it becomes clear that this accompanying person represented ‘business’ interests, for which reason the protocol takes on a completely different implication than that propounded by the 13 authors of the study in *Archaeologia Austriaca*.¹⁹

In our publications such documents are considered ‘primary sources’ that contain a great amount

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Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt
LANDESMUSEUM FÜR VORGESCHICHTE

23.7.01
11. MAI 2005

1. Westphal besichtigt (Reise ohne Kamera)
2. Westphal per Telefonat
LG
Halle in 26.05.2005
überseht.

3. 2. wird
(Vogel)
Staatsanwalt

Gesprächsnotiz

Ort: Landesmuseum für Vorgeschichte

Teilnehmer: Herr Henry Westphal
Herr Andreas Gehl
Herr Dr. Reichenberger, LDA
Herr Dr. Möller, LDA

Zeit: 11.05.2005, 15.00 – 16.55 Uhr

Herr Andreas Gehl hatte über das Sekretariat des Landesarchäologen um einen Termin gebeten. Der Landesarchäologe telefonierte daraufhin mit Herrn Gehl und vereinbarte den o. g. Termin, der Gegenstand der Gesprächsnotiz ist.

Fig 1 Detail from notes made in the protocol. LDA Sachsen-Anhalt, 11. Mai 2005.

of information. ‘Secondary sources’ have been taken into view as well until now. However, contrary to primary sources they can rather display tendencies and are of significance for the overall picture, but ultimately they are not decisive. Many reports are known from the metal-detecting scene in the region, which inform that the Mittelberg was never considered to be the findspot of the Sky Disk, above all, because neither prior to the discovery of the disk nor after its disclosure did the Mittelberg become known as a promising goal for metal-detecting. The opinion that the discovery site of the disk was not the Mittelberg runs along the lines of information, in part directly to the two finders. They issued statements such as: “The site is false”; “Everyone on the scene knows that the disk was found alone”; “Renner and Westphal have always said that the Mittelberg is ‘bullshit’”²⁰ In as far as the Mittelberg was named in individual cases, there was always a link to the first buyer of the find, A. Stadtmüller, from whom the initial name of the site stems.

Alleged find situation and humus layer on the Mittelberg

A second example of the need for critical analysis of the source material. Due to the lack of reports on excavations on the Mittelberg, a reconstruction of the original conditions that existed there is difficult. This especially when viewed against the background situation and the accusation that in the case of the so-called looters’ pit as well as an imaginative find situation, including the buried water bottle.²¹ In order to determine whether

or not the hole revealed in a scientific excavation is the actual pit from the illegal excavation, and there the site of an original archaeological find context, the recent ground soil must be examined. According to corresponding statements, the Sky Disk was found directly below the surface (3 to 5 cm) (GEBHARD & KRAUSE, 2016, 27). According to the evaluation of the sources, if the disk was indeed found at the presumed findspot, then it should have lain partly in recent soil and not in an archaeological find context. Instead of solving the lacking publication height measurements with a level prior to the excavation, among others, two different values were chosen for the upper soil and entered into the discussion, in order to solve the presumed contradictions in the finders' information: namely: 5 cm and 6-8 cm in thickness (PERNICKA ET AL., 2020, 92 u. 95). To confirm this, an excavation photograph was presented, which shows on the right edge the remaining layer (in a hardly determinable thickness) of the upper soil, which unlike the original surface had clearly been removed. In this respect the following discussion

in 2005 by experts is quite comprehensible, according to which the thickness of the upper soil was reconstructed to 15-20 cm, a thickness that finally even led to a decision in the course of the court trial (Fig. 2). As has already been explained above, for methodical reasons and due to the lack of substantial data, the alleged findspot of the Sky Disk on the Mittelberg must be ruled out.

Analyses of remains of soil adhering to the Sky Disk

A decisive argument anew in favour of the assignment of the findspot and the affiliation of the different bronze artefacts to one hoard are the recent analyses of a soil sample (70 gr, 30-40 cm under the upper humus layer), in comparison with the soil remains adhering to the disk (0.113 gr), to a sword (0.217 gr) and to an axe (0.049 gr), here with reference to Adam 2019, 87). A detailed stand was already taken with regard to the expert assessments available to us in the court proceedings.²²

26 Ns 33/2004

Beschluss

In der Strafsache
gegen

Reinhold Richard Johannes Stieber
Hildegard Burri-Bayer

Der Antrag der Angeklagten Burri-Bayer aus dem Schriftsatz deren Verteidigerin vom 17.03.2005 (**Anlage 5 zum Hauptverhandlungsprotokoll vom 18.03.2005**) wird wegen Offenkundigkeit gemäß § 244 Absatz 3 Satz 2 StPO zurückgewiesen.

Dass die Humusschicht an der von den Findern beschriebenen Fundstelle 15 bis 20cm betragen haben könnte, hat das Gericht im Zuge der bisherigen Beweisaufnahme sicher in Erfahrung gebracht.

Da zwischenzeitlich ein mehrfacher Abtrag des Erdreiches an der dortigen Fundstelle stattfand, verspricht sich das Gericht von der angebotenen Sachverständigenbeweiserhebung keine weitere Aufklärung.

Fig. 2 Excerpt from the court order from 2005 of the trial at the 10th Criminal Chamber of the Halle Regional Court (from 01.09.2004-26.09.2005. Reference 26 Ns 33/2004).

A stand was also taken on the supplementary examination of clay minerals, which – as the study group of 13 authors meanwhile also writes – cannot be drawn upon for an exact determination of a findspot.²³ The detailed discussion led to the following statement in the court decision in 2005: “It has been determined that scientifically there is no secure possibility through which the comparison of (soil) samples found on the Sky Disk [...] are secure proof that it [...] had lain only there in the ground.” (in the original: Es ist „festgestellt worden, dass es wissenschaftlich keine sichere Möglichkeit gibt, durch den Vergleich von der ‚Himmelscheibe‘ [...] gewonnener Proben [...] den sicheren Nachweis zu führen, dass sie [...] – nur dort im Boden gelegen hat.“)²⁴ A crucial aspect thereby is the problem of the extremely small size of the sample. The expert appraisal by the forensic chemist Jörg Adam bases upon the assumption that a soil sample with the weight of 0.113 gram is sufficient for the definite determination of a findspot. Adam did not undertake a systematic examination of this problematic sample, nor did he quote any such investigations. If his assumption were correct, then this must be recognisable in a series of analyses. That is, basing on the analysis of soil samples, each 0.113 gr, from ca. 15 randomly selected sites in a geologically similar landscape could be explicitly identified. This kind of evidence was not presented; further, there is no reference to examinations in literature cited by Adam.²⁵

The deficit in the disclosure of the data attained thus leads to great uncertainty. The statement that “The methodology used in the investigations and the results have been published in detail” (PERNICKA ET AL., 2020, 103). Namely, it is not understandable, and therefore the summarising table cannot be evaluated. In this respect it is methodically vulnerable, because the determination of the “percentage correlation [...] of analyses data” („prozentualen Übereinstimmung ... der Analysendaten“) at 5 bases upon further broken down into sub areas, all of which can be measured the same: general characteristics, chemical analyses, grain size, sand fraction, silt fraction. The largest portion in the evaluation is sand (31 “features”) and silt (81 “features”), opposite only 7 “features” in the chemical analyses (ADAM 2019, 92 Tab. 1; PERNICKA ET AL., 2020, 104, Tab. 2). Observing the last named features, this indicates that 4 to 7 corresponding features is not a convincing result. It is also unclear whether the individual samples among each other correspond with the same features, or whether the correspondence is only due to the respective soil sample. And so accordingly, the statement: “This means that no dif-

ferences were observed between the sediments on the Sky Disk and the sword” cannot be verified nor is it understandable. This presents a serious problem indeed, as for the 13 study authors this is “key evidence for the unity of the hoard” (!) and with that the sole argument to which the authors refer as evidence of the source of the disk “in a hoard” on the Mittelberg (PERNICKA ET AL., 2020, 104).

Noteworthy in the publication of the soil assessments (as late as 2019) is that the axe – a part of the “hoard” – is omitted in the concluding sentence in the original evaluation report. “These results are rather indications of another site, at least to a position in other layers than those of the Sky Disk and the sword.” (in the original: „Eher weisen diese Ergebnisse auf einen anderen Fundort, zumindest auf eine Lagerung in anderen Schichten als die Himmelscheibe und das Schwert hin.“). Archaeologically in view of this particular expert opinion, it can only be concluded that the axe was not a component of the reconstructed hoard. The consequence must be drawn that, according to general recognised scientific criteria for a ‘closed find’ (see definition above), the convolute of bronze artefacts is not a hoard, whose components were deposited in the earth at the same time and in the same place.

Evidence of gold and copper in excavations on the Mittelberg near Nebra

The 13 authors of the study in Archaeologia Austriaca consider as a decisive indication that in the course of excavating the looters’ pit on the Mittelberg, evidence of an increased content of copper in connection with an increased content of gold was noted, an observation that would indicate the original position and deposition of an artefact with larger amounts of gold and copper on its surface, in specific: the Sky Disk (PERNICKA ET AL., 2020, 96; vgl. PERNICKA ET AL., 2008, 342–346 Abb. 14–16.). As with the soil analyses, the study authors do not provide any information about the conditions of taking samples or the course of analysis. The analysis of gold, in particular, in the area of parts per billion (ppb) is extremely sensitive as regards contaminations. Thus, the individual values in the series of analyses from the looters’ pit cannot be interpreted in detail. Also, a relative comparison with samples from different soil horizons at the site is not possible, because analysis series of sufficient extent are lacking. The sample values can only be compared with published data with generally known background

values. It has already been determined that the values of gold compare to values in natural variations as known in literature (GEBHARD & KRAUSE, 2016, 37). The values for copper samples also lead to the suspicion that the results here are due to the geogenic background. Namely, the measured concentrations lie within the normal range of that which is attested in Sachsen-Anhalt and neighbouring regions (BODENBERICHT, 2014). Observing the excavation context, then the excavated pit was filled with: on the one hand, mixed material of the find context and the ground surface (layer 4b), and on the other hand, with pure surface material that did not derive from the pit (layer 4a) (PERNICKA ET AL., 2020, 97, Fig. 8). The minimal difference between copper concentrations in layers 4 and 4a strengthen the suspicion, that the attested copper contents are geogenic and did not derive from corroded copper objects stored at this place.

Interpretation of the metal analyses

As noted above, the metal analyses are not methodically suited for answering questions concerning dating of the disk nor for questions concerning its representing a 'closed find'. The raw copper ore is a comparably unspecific kind of copper, which was used over a very long span of time in the second and first millennia BC. In this place there is no need to go into this topic any further. New information by the 13 authors of the study is helpful in that they enable a correction to be made to an attribution that until now could be reconstructed only in a lengthy, indirect way (PERNICKA ET AL., 2020, 108-109). Namely, the new representation of lead isotopes results in a confusing picture, which until now could not be solved basing on available publications. This image shows that there are different methods of measuring lead isotopes: those with a higher Pb-content in Freiberg (2003) and new measurements with a lower as well as higher Pb-content (Mannheim 2007), which then should correspond with the accompanying finds (PERNICKA ET AL., 2020, 107 Fig. 24). Pernicka can now declare (2020) that D. Nickel (2003) used incorrect values, which however could be confirmed in the Mannheim measurements, yet without being able to specify the cause of these differences. Because the measurements with a higher lead content display higher precision, they would actually be preferred. As a contamination of samples is ruled out (PERNICKA ET AL., 2020, 107), the question as to the homogeneity

of the material should be investigated.

The situation is similar in the efforts to prove the Mittelberg district as the source of the copper ore utilised for the disk, basing on the operating times of the three large ore-bearing regions in the Mittelberg (PERNICKA ET AL., 2020, Fig. 23). Indeed, ore exploitation there reaches as far back in time as the beginning of the Iron Age. Consider the unexpected find contexts and results gained by our Zürich colleagues on the Oberhalbstein: there, unexpectedly, in the midst of (Middle)/Late Bronze Age copper ore exploitation, clear signs of copper mining in the Hallstatt period are attested (TURCK, 2015). This is indeed, a scientific confirmation of our arguments. In short, the argumentation for the Mittelberg as the source ore-deposit for the copper of the Sky Disk is based on the state of research reached until now and does not represent a criterium for rejecting the possibility that the copper of the disk was indeed mined during the Iron Age. This fact is important to note, if scientific data and their informative significance are placed in the foreground of argumentation – as is the case with Pernicka et al. 2020.

On the question of the production of the Sky Disk

For the first time after almost 20 years a complete x-ray image of the Sky Disk has been published in the study by the 13 authors (PERNICKA ET AL., 2020, 99 Fig. 11). Recognisable in one part of the disk are round, dark discolorations varying in size. They are indicative of zones of lesser thickness or hollow areas inside the disk. The 13 authors interpret this image as "*pitting due to heavy corrosion*", and they note that here information about the situation in the ground can be gained, as this area in a deeper layer in the ground would be corroded. If this is indeed true, then a critical point would be solved, a critique expressed by Josef Riederer in 2005, who in view of the problematic about the postulated partial location in humus pointed out the lack of differences in the corrosion (GEBHARD & KRAUSE, 2016, 40).

In order to be able to follow the argument of zones, first the earlier postulated position of the Sky Disk in the ground must be changed. This would then bring into line the new orientation with traces of damage (PERNICKA ET AL., 2020, 100 Fig. 12). However, a scientific justification that concerned here is pitting due to corrosion is still lacking, although on the basis of available (but still not published) computer tomographs of the

disk in section this corrosion could be easily illustrated.²⁶ Systematic studies on pitting corrosion on archaeological objects cannot be denoted here; yet in view of extensive experience in the subject of conservation and restoration, the interpretation of the colleagues in Halle can be excluded: Firstly, the alloying of the disk is not particularly susceptible to this form of corrosion. Secondly, this kind of corrosion is always also recognisable on the surface. However, the patina on the disk – on the reverse side as well – is consistently sealed and was identified as ‘malachite patina’.²⁷ If the theory of ‘pitting corrosion’ were appropriate, then a malachite patina would have formed over this corrosion in a second stage of corrosion. But this scenario can be excluded as completely unlikely. With reference to the interpretation of the poor-resolution X-ray image, a clear indication is found in an earlier detail illustration (MELLER, 2010, Abb. 14b). In this detail the continuation of the porous zone can be distinguished from the overlying sheet-gold arc on the curved rim. This finding rules out a formation of corrosion. With this finding, therefore, concerned here are with great probability casting holes in zones (“zoniert auftretende Gusslunker”), which formed through the rapid solidification of the metal. This result is interesting inasmuch as from it the possibility might be deduced that the disk was not forged from a blank, but instead it was cast in one piece. Whether or not the blank, as is to be presumed, was also worked again, must be analysed. This stimulates further examinations with the question, whether the gold surfaces were intentionally applied in these places so as to cover the defective structure in the bronze. Is the remarkably extreme positioning of the crescent moon on the rim of the disk the consequence of a technical fault? Was the attempt to apply two stars in the deficient places abandoned and the surface of the rim covered with the arc. These questions are a clear sign that examinations of the Sky Disk may not be ‘put aside’ (ad acta). The impression arises far more that they have just now gained headway for more examinations.

Perspective of all issues and outlook for future research

The numerous open questions pertaining to the bronze disk, which according to the statements by Harald Meller should stem from the Mittelberg by Kleinwangen near Nebra, could not be resolved in the new article presented by the 13 authors of

the study in Halle and Mannheim (PERNICKA ET AL., 2020). On the contrary, a rebuttal to the critical remarks in arguments on our part and others, entails only repetitions of the sometimes up to 20-year-old assertions and data (likely due to time pressure).²⁸ Until today nothing can contribute towards clarifying the problematic conditions at the time of discovery or explain them, nor can evidence be offered that concerned here is – as maintained by Meller from the start – a closed hoard found on the Mittelberg.

In fact, today we must assume different findspots for the individual objects in the so-called hoard: one site from which the bronze disk stems, one site for the pair of swords, and finally several sites as the source of the axes, the chisel and the arm rings. The ‘findspot’ on the Mittelberg, which Meller first publicly pronounced as such at a news conference on September 25, 2002, appears as a fictional and constructed findspot (SCHÖNE, 2008, 113). His assertion occurred without the required expertise and critical discussion. Despite all efforts and the application of scientific data, the actual findspot of the bronze disk can be disclosed only by the two finders. This would be greatly welcomed after 20 years of debate!

The construct brought into play by the first buyer together with the finders, and further developed by Meller was that the bronze disk and the other bronze artefacts are components of a hoard – through which the bronze disk can be dated. This cannot be upheld in any way and lacks all methodical and theoretical foundations of our field, Prehistoric Archaeology. Furthermore, today it is more than obvious that it could never have been a ‘closed find’, for only after the discovery of the bronze disk by the detectors was the convolute augmented by the two swords, the axes and further artefacts from other find associations, in order to gain a better price in their sale. The fabrication of a false findspot towards the dealer followed the motive of hindering further investigations by a third party at the actual discovery site of the bronze disk. The bronze disk with sheet gold applications cannot be dated by means of the artefacts that were purchased at the same time.

Since the Sky Disk has become publicly known, note has been made that the representations on the disk have nothing in common with an iconography of the Bronze Age. As addressed in various earlier articles, our new considerations also indicate that the motives on the disk date to the first millennium BC. With that the disk and all of the constructs and histories built up around its context lose their basis. They cannot be upheld in

this form nor carried forth. Instead, a modern archaeology based on serious science should open, accepting new approaches and interpretation of the disk in a changed cultural environment, and furthering the pursuit of these new approaches.

Agenda for the Sky Disk Research Group in Halle

The Sky Disk from Nebra was retrieved under unfortunate conditions and very quickly made known to the scientific community. It has since been the subject of wide debate among specialists, the media and the general public. Many of the 'damages' that occurred to the Nebra Sky Disk and especially the lack of information about the site of its discovery could not be completely clarified later by the responsible team of H. Meller in Halle.

Now, in order to pave the path for further enlightening research on this highly significant object by international experts, it is our opinion that five fields of tasks should be undertaken, whose appropriate and factual realisation can be expected by the scientific community as well as by the general public from the colleagues in Halle.

1. The publication of the scientific excavations on the Mitterberg in the years 2002-2004 which were conducted by the Landesamt für Denkmalpflege und Archäologie (LfD) Sachsen-Anhalt. The publication of the excavation reports should appear in the year 2021, ideally in the English language as well as in Open Access.
2. The publication of reports concerning the restoration and conservation measures on the Nebra Sky Disk, which were carried out by the LfD Sachsen-Anhalt, and also the reports about all subsequent technical investigations. These reports should entail, among others, the following examinations and methods: X-ray, computer tomography (CT), microstructure, patina on the front and back side of the disk, examination of the gold applications with regard to corrosion (silver and copper accumulations on the outer and inner surfaces), and microscopy. The publication of these reports should appear in 2021, and future reports on further examinations should follow directly. Ideally, these publications should appear in scientific journals, also in the English language, and in Open Access.
3. The publication of methodical sedimentological studies, which were carried out by the forensic expert Jörg Adam on the soil sediments that were still adherent on the retrieved finds. This

publication, complementary to the report made in 2004, should appear in 2021, ideally also in the English language and in Open Access.

4. A final, comprehensive publication of all objects that were recovered should be issued, according to the usual archaeological criteria and specialist standards, as well as of all archaeological and scientific data and examinations according to international criteria (peer reviewed). A final publication of the entire find convolute, the Nebra Sky Disk and the other finds, was pre-announced in 2008; it is still lacking today. The final publication should appear at the same time as the restoration and conservation reports, ideally also in the English language and in Open Access.
5. A comprehensive sedimentological study of the Mittelberg and its surroundings should be undertaken in order to achieve a characterisation of the soils (basis: AG Boden 2005, Ad-hoc Arbeitsgruppe Boden). This study must include a systematic examination of the alleged increase in gold and copper contents in the soil at the supposed site of the Nebra Sky Disk's discovery. It would be achieved through a series of analyses on soils from the Mittelberg and vicinity. Thereby, this would enable the determination of vacillations in the natural contents of soils. All of the data gained should be published in a soil science journal (peer reviewed), ideally also in the English language and in Open Access.

Notes

¹ Quote of the palaeoanthropologist Scott Williams in the course of discussion about the upright gait of the recently discovered remains of the great ape 'Udo' in the Allgäu, after: A. Franz (28.11.2020), Paläoanthropologie. Doch kein Frühaufsteher? Süddeutsche Zeitung, 28./29. Nov. 2020 [online 28. Nov. 2020]. Cp. the publication by Williams, S. A., Prang, Th. C., Meyer, M. R., Russo, G. A. & Shapiro, L. J. (2020). Reevaluating bipedalism in Danuvius. *Nature* 586, E1-E3(2020), 30 Sept 2020. Jan. <https://doi.org/10.1038/s41586-020-2736-4> [18 Jan. 2021].

² For the concept of the expression 'closed find' (geschlossener Fund) see M. K. H. Eggert (2005, 54-55) and S. Wolf-ram, under the catchword 'sources' in: Mölders & Wolf-ram, 2014, 233-237, esp. p. 235.

³ Gebhard & Krause, 2020. For the press accounts, cf. a selection in the compilation issued by the DFG (German Research Foundation): www.dguf.de/himmelscheibe.html bzw. www.dguf.de/nebraskydisk.html [18.1.2021].

- ⁴ Joint news release on November 13, 2020, of the Österreichische Akademie der Wissenschaften and the Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt – Landesmuseum für Vorgeschichte.
- ⁵ Pernicka et al., 2020.
- ⁶ Cp. the role and works of A. Busch: Gebhard & Krause, 2020, 17.
- ⁷ Until this day we still know nothing about the archaeology of the Mittelberg and its fortification and the nearby settlement(?) of the Iron Age. In the article by Pernicka et al. (2020) a hitherto unpublished excavation report by E. Koiki from 2006 is mentioned for the very first time (cf. there under 'References'), a report that as important archaeological basis should have appeared long ago.
- ⁸ By contrast surprising is the lavish praise given by the general director of the Römisch-Germanisches Zentralmuseum in Mainz, Prof. A. Busch, who commented in a Twitter message: "an excellent contribution following the principles of good scientific practice" (in the original „Ein hervorragender Beitrag nach den Regeln der guten wissenschaftlichen Praxis!"). Beitrag (@AlexandraWBusch), 16 Nov. 2020.
- ⁹ Article by Karolin Dörner in mdr WISSEN, 24 Nov. 2020, titled: „Bronze- oder Eisenzeit? Der Streit um die Himmels-scheibe geht weiter." <https://www.mdr.de/wissen/himmelsscheibe-nebra-streit-um-alter-100.html> [21.12.2020]. Unfortunately, through this viewpoint new and constructive examinations and considerations are hindered.
- ¹⁰ News in brief in: MDR, Sachsen-Anhalt, 8 September 2020.
- ¹¹ Pernicka et al., 2020.
- ¹² Gebhard & Krause, 2016; Gebhard & Krause, 2020. The article, published in 2020, was completed in 2018 and discusses the source material known at that time.
- ¹³ Quote: „Die Studienautor/innen weisen darin nach, dass Gebhard und Krause mit unvollständigen und teilweise falschen oder verfälschend wiedergegebenen Daten argumentieren." Joint news release of the Österreichische Akademie der Wissenschaften und des Landesamtes für Denkmalpflege und Archäologie Sachsen-Anhalt. Landesmuseum für Vorgeschichte vom 13 Nov. 2020, p. 2.
- ¹⁴ Gebhard & Krause, 2016, 42; Gebhard & Krause, 2020, 1 and 17-18.
- ¹⁵ „Die Indizien sprechen dafür, dass die Scheibe vom Mittelberg stammt. Aber 100-prozentige Sicherheit gibt es nicht. Die könnte nur ein Geständnis der Finder bringen." Sternenscheibe-Streit. Gehört Sie den Bayern? Bild Halle, 25 June 2003, p. 7.
- ¹⁶ Sketch last viewed in Pernicka et al., 2020, 98, Fig. 9. The accompanying discussion about it in Gebhard & Krause, 2016, 27–28. The sketch presents the by then publicly known ideas about the findspots. It is noteworthy that the location of the findspot is now contradicted in Pernicka et al. (2020, 98–102) and underlines the original first statements of the finders with regard to the position of the finds, according to which the sun and the horizon were located above.
- ¹⁷ Gebhard & Krause, 2016, 28–29.
- ¹⁸ Pernicka et al., 2020, 97.
- ¹⁹ Files in the Bavarian State Archaeological Collection, München. Fax: Staatsanwaltschaft Halle 13 May 2005. Documents RA Thom Erben, Protocol of a conversation with Westphal und Gehl on 11 May 2005.
- ²⁰ Statement by two dealers in metal-detectors devices, in northern and southern Germany. Files in the Bavarian State Archaeological Collection, München, memorandum.
- ²¹ More information about the glass water bottle is lacking. It is of importance for the 13 authors of the study. Interestingly, only a few sherds of the body were found. The montage of the bottle created for the exhibition suggests an incorrect image (SCHÖNE, 2008, 19 Fig. 5).
- ²² Gebhard & Krause, 2016, 32–37 and 307, App. 6; Gebhard & Krause, 2020.
- ²³ Pernicka et al., 2020, 105: "It is important to note that these determined mineral parageneses are typical for the underlying sandstone-mudstone bedrocks and – on their own – do not allow a precise determination of a certain provenance".
- ²⁴ Judgment of the 10th Criminal Chamber Regional Court, Halle, 26 Nov. 2005. File number 26 Ns 33/2004, p. 33.
- ²⁵ Adam, 2019. There is no information in the bibliography about the methods employed in the examination, which can be termed "forensische Bodenkunde". In Pernicka et al., 2020, 103 fn. 43, an attempt is made to resolve this deficit.
- ²⁶ A. Reichenberger, after: (2015). „Die Himmels-scheibe von Nebra wurde fehlerhaft gegossen." In the newspaper: Die Welt, 30 June 2015. <https://www.welt.de/print-welt/article679488/Die-Himmels-scheibe-von-Nebra-wurde-fehlerhaft-gegossen.html> [13.1.2021]. Compare: <https://www.kn-online.de/Nachrichten/Wissen/Neue-Goldspuren-auf-Himmels-scheibe-von-Nebra-entdeckt> [13.1.2021].
- ²⁷ Pernicka et al., 2008, 339. On the cohesiveness of the patina layer in area between the crescent moon and the curved arc on the rim, cf. also Meller, 2010, Fig. 14a.
- ²⁸ Gebhard & Krause, 2016; Gebhard & Krause, 2020. Further recommended reading: Müller-Straten, 2015.

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