

Ethics, science and conflict in the amber mines



Journal of Applied Ethical Mining of Natural Resources and Paleontology (PMF Journal)

Publisher: Peretti Museum Foundation (pmf.org)
Production Editor: Matthias Alessandri, FGA
Contents: Article 82 pages, 160 illustrations
ISBN: 978-3-906905-11-2

Front Cover: A Burmese family from an Internally Displaced Person camp head to an amber mine at Mine Khun, near Tanai, in December 2017. They carry the minimal provisions, including a green tent and the illusion of an income from amber mining (snapshot from GRS film).

Copyright © 2020 by PMF (Peretti Museum Foundation, Baumschulweg 13, 6045 Meggen, Switzerland)

ADVISOR TO PMF JOURNAL

Prof. Dr. Luis M. Chiappe
Curator of the [award winning Dinosaur Hall at the Natural History Museum of Los Angeles County](#), adjunct professor at the University of Southern California and [AAAS Fellow](#)

GRS BOARD REPRESENTATIVE

Dr. Detlef Günther
Zürich, Switzerland

FORMAL PMF ADVISORY BOARD

see www.pmf.org/bylaws

EDITORS

[Dr. Joseph J. Bevitt](#)
Australian Centre for Neutron Scattering,
Australian Nuclear Science and Technology Organisation,
New Illawarra Rd, Lucas Heights NSW 2234, Australia

[Dr. Juan D. Daza](#)
Vertebrates, Department of Biological Sciences
Sam Houston State University, 2000 Avenue I
Life Sciences Building, Room 105
Huntsville, TX 77341, USA

[Prof. Dr. Thomas Armbruster](#)
Mineralogy and Crystallography,
formerly University of Bern, Switzerland

[Dr. Adolf Peretti, EurGeol](#)
President of PMF and GRS, Switzerland

[Selected members of the Amber Symposium](#)

[Selected members of the GRS Board of Directors](#)

GRS Gemresearch Swisslab AG (GRS), Meggen, Switzerland has a cooperation and MOU with PMF.

The PMF Journal can be accessed for free after registration at www.pmf.org/journal by stakeholders of the amber research community or those with an avid interest in the field.

All requests to be sent to the editor@pmf.org.

SUBMISSION HISTORY AND IMPORTANT UPDATES

24 Apr 2020	PMF sent formal letter to SVP
9 Jul 2020	Draft of article received by PMF
16 Jul 2020	Draft of PMF Journal sent to SVP
22 Jul 2020	PMF sent letter with witness accounts to UN Human Rights Council with copy to SVP
22 Jul 2020	SVP releases a statement reconsidering their total ban of Burmese amber, similar to the suggestions made by PMF
1 Aug 2020	www.pmf.org content is cited in a comment to the letter of SVP dated 21 April 2020 by Haug J.T. et al., 2020

PMF Journal publishes research material and industry reports about, and of those whom are involved in the active and positive engagement with underprivileged and/or indigenous communities, scientists in developing countries, with organisations providing income to alternative industries that compete with totalitarian or human rights violating regimes, and whom promote nature conservation, increasing safety standards and improved living conditions for miners, as well as involving in humanitarian activities.

Message from the editor



Welcome to this, the first edition of the Peretti Museum Foundation's Journal of Applied Ethical Mining of Natural Resources and Palaeontology (PMF Journal).

The concept for the PMF Journal has been in my mind for many years. With over two decades of direct engagement with all aspects of the mine-to-market gemstone industry, I have been confronted with the vast inequalities that exist in the sector, witnessed both reforms and declines in workplace safety, civil wars, and the transformation that occurs when big industry and modernisation challenge, and override proud, local traditions. Spurred by a recent letter by the Society of Vertebrate Paleontology (SVP) that sounded an alarm regarding the mining of Burmese amber, and the controversy that followed, I have finally taken leave from the lab to establish this journal, beginning with a deep-investigative dive into the supply and trade of Burmese amber, or Burmite, and to contribute to the discussion of how to ethically deal with, and conduct research on Burmite and the fascinating ancient wonders trapped within. Let this edition be a call to others to join the conversation on ethical mining, and to drive affirmative action by increasing public awareness of current, and past inequality in the industry.

Recent reports have suggested that the acquisition of Burmite involves several controversial aspects. In its letter (Rayfield, Theodor and Polly, 2020) the SVP recommended a ban on all publications regarding Burmite produced after 2017, a recommendation that was met with considerable consternation amongst the stakeholders of the scientific community. Regarding ethical issues, during the European Association of Vertebrate Paleontologists (EAVP) 14th annual meeting in Haarlem, Netherlands, the crucial role of private museums was addressed without mentioning the SVP recommendation. Our Foundation, as the operator of a private museum, appreciates this forum, particularly as it provides advice on responsibilities and other educational matters; but more needs to be done.

Regarding SVP's proposed ban on the publication of research based on Burmite material mined after 2017, the International Palaeontological society (PE) has issued a counter statement focusing on ethical guidelines for the handling of Burmite. The varying positions between SVP and PE are unsurprising, given that the invertebrate group represents a major stakeholder in the research of amber and is heavily impacted by SVP's guidelines on ethical conduct.

A host of major scientific publishers immediately adopted the SVP policy, in full, or in part, and are refusing papers on Burmite. This needs to be addressed in a broader discussion that involves all stakeholders.

In recognition of the complex issues involving the acquisition and study of Burmite, and following consultation with the Peretti Museum Foundation and other parties, on 22 July 2020, [SVP published a collection of publicly-available reports and guidelines on Myanmar amber, mining, human rights violations, and amber trade.](#)

This first edition of the PMF reports upon a fact-finding mission into the Burmite industry, providing useful maps of Burmese amber-mining areas and reports on conflicts within those mining regions. It also analyzes official data on Burmese amber sales and reviews recommendations by the United Nations Human Rights Council (UN-HRC), which conducted a fact-finding mission on "The economic interests of the Myanmar military", in September 2019. This information is urgently needed to inform members of the paleontological community on the SVP recommendations, before irreversible decisions are made on the basis of a less-than-thorough database of information.

In order to illustrate the realities described in the report, an appendix is supplied with full and powerful photographic witness accounts from remote and often inaccessible Burmite mining areas.

The PMF seeks to create a venue where research with the highest ethical standards can be published; I expect that publications fulfilling these conditions will set the bar high and can be used as an example of best-practices to be followed in future publications.

KEY WORDS

auctions, amber, burmite, conflict, gemstones, scientists, Burmese military, Myanmar, Rohingya, Human Right Council, IDP, SVP, PMF.

Ethical Guidelines for Burmese Amber Acquisitions

by Adolf Peretti, Peretti Museum Foundation
Baumschulweg 13, 6045 Meggen, Switzerland

ABSTRACT

The ethical implications involved in the acquisition of Burmite with fossiliferous, and in particular, vertebrate, inclusions have been discussed in detail in a number of scientific research, traditional, and social media outlets. At PMF we have compiled and analyzed information on the matter from a variety of sources, including maps of conflict versus non-conflict amber mines and statistics from state-run Myanmar Gem Enterprise (MGE) auctions as well as an analysis of trade volumes at amber markets. In addition, PMF has done a thorough review of a report by the U.N. Human Rights Council's 2019 Independent International Fact-Finding Mission on Myanmar (UN-HRC) regarding human rights abuses by the Burmese military and security forces in regard to the international trade in amber. Based on our understanding of all the information, PMF has come to the following conclusions:

- Amber sales from the officially sanctioned MGE auctions (which are seen as a possible contributor to the Burmese military's war effort) from 2015-2019 account for less than 0.1% of the total sales of gemstones. Most of the revenue from the auctions involved sales of jade and other gems (99.9%), while no amber with vertebrate inclusions was recorded in official sales catalogs.
- The complexity of the discovery process of vertebrate Burmite inclusions rules out the possibility of sponsoring the armed conflict.
- The most important players in Burmite mining are from the private sector. The dominant major private enterprise in the amber mining sector was scrutinized in the UN-HRC report, but did not receive a ban for any amber mining activities.
- No scientists involved in the acquisition of amber were found to have any connection to armed forces that carried out actions against the Rohingya people (see international press coverage), as shown in a review of market analysis and the scientists' research activity.
- The UN-HRC report recommends that the acquisitions of natural resources should be made through channels that are in opposition to the Burmese military regime.

PMF agrees that business dealings in Burmese amber with vertebrate inclusions should continue to be done through indigenous people or those in Internally Displaced Person (IDP) camps, as they have a

theoretical advantage in this niche owing to their dominance of the important polishing sector of the middle market. It is during the polishing process that discoveries of amber with vertebrate inclusions are made. This potentially-abused and disenfranchised part of the local society should be encouraged to engage in the discovery of paleontological samples rather than hindered or blocked. PMF recommends that the paleontological community aid the community through supporting improvements in infrastructure, the provision of professional and accredited training in identification methods, guidance and direct intervention to minimize, and eventually abolish business and trade with unethical players in the region. This can best be done in connection with humanitarian projects, examples of such engagements that have been successfully executed are showcased in this report. In general, the recommendations in the UN-HRC report allow for two approaches to the matter, one negative and one positive. The negative approach has been the initial response and recommendation of the SVP, which promotes a ban on all publications regarding Burmese amber obtained after 2017.

The UN-HRC report recommends a more balanced approach, which involves a continuation of acquisitions from “ethical players” as a measure to strengthen their position against the “unethical players.”

A direct mine-to-market approach with total oversight of all different steps of the market chain is now possible for the mining areas outside the conflict zone (Khamti). The Myanmar government recently auctioned off plots of land to local miners, making this traceable approach possible in the non-conflict zone. PMF has initiated a pilot project in one of these non-conflict amber mines that test cases a traceable and fully-transparent example for ethical amber acquisition in Myanmar.

ABOUT PMF

The Peretti Museum Foundation (pmf.org) is a private museum based in Meggen, Switzerland, that curates paleontological and gemmological specimens in accordance with Swiss law and under strong government oversight to ensure perpetual public access to the collection.

PMF supports research activities and various publications while also providing funding for museum activities. The PMF is also actively engaged humanitarian missions.

The PMF Journal publishes research material from various sources involved in active and positive engagement with underprivileged communities and underfunded scientists in developing countries. These sources help to provide income to alternative industries that compete with totalitarian or human rights-violating regimes, and also work to promote nature conservation, increased safety standards and living conditions of miners, among other humanitarian activities.

Contents

Introduction	8
Amber-Mining Areas in Myanmar: Geographical and Geological Settings	9
Cretaceous carbonaceous stratigraphic columns with layers of amber, ammonite and vertebrate occurrences at the new Khamti mine	17
Correlation of research timing of published amber research with conflict events	19
Estimation of amber business by the Myanmar Government	21
The amber mining marketstructure compared with the world's diamond market	25
The location of valuable material in a conflict zone, such as amber in Northern Myanmar, raises ethical questions with scientists	28
Hukawng valley offensive: a timeline	30
Myanmar: New displacement in Kachin (April 1 - April 29, 2018)	32
Review of the U.N. Human Rights Council report for the purpose of establishing the correct position in dealing with amber from Myanmar	34
Summarized conclusions of the review of the Human Rights Council Fact-Finding Mission on Myanmar 2019	41
PMF: Conclusions	42
Photographic and e-mail witness account: Appendix 1 to 26	44
Literature	73
Acknowledgments	77
Pledge to ethical engagement	78



Introduction

The fact that there are different amber-mining provinces in Myanmar – those in conflict zones and those in non-conflict zones – is generally not widely addressed in the scientific and trading communities. We therefore provide a detailed map on the amber-mining regions, highlighting the conflict- versus non-conflict zones, along with a detailed review of the ethical situation in these areas, with a focus on the work of the UN-HRC.

In 2019, the UN-HRC sent a team to Myanmar to examine the Burmese military's¹ economic interests vis-a-vis the amber trade. It investigated how the Rohingya conflict was financed through the exploitation of natural resources, and offered some recommendations for the natural resource including amber-trading industry. We have studied this report in detail and have summarized the key takeaways regarding the handling of Burmese amber, and reproduced and extracted the specific guidelines of the UN-HRC for the benefit of the paleontological community.

An estimate of the profits that the Burmese military has made from amber sales is provided by analyzing the Myanmar Gem Enterprise (MGE) government auctions from 2015 to 2019. These auctions are generally considered one of the Burmese government's main revenue sources, and offer significant insight into the government's dealings in natural resources, and in particular amber. After reviewing the 2015-16 studies by the

Myanmar Extractive Industries Transparency Initiative (EITI) we had a better understanding of how the Burmese government and military profits from the amber trade, using the MGE sales information as a comparative base. The stakeholders involved in the private amber-mining industry have also been identified, along with details of their ownership, company structures and registrations. We have compared these private stakeholders against the list of companies and individuals who, according to the UN-HRC recommendations, should be banned from doing business. Our analysis of the amber market is made in comparison with the market model for the diamond industry. In this market chain analysis, we discuss what position in the market chain that the discovery of vertebrate inclusions in amber can be made, and how this process relates to the major stakeholders in the amber-mining industry. We have compiled this information to provide the paleontological community with a more informed decision-making process regarding Burmese amber publications. Based on this data, we provide our own interpretation of how to judge scientific publications on Burmese amber in connection with the larger ethical situation in Myanmar. We also propose some concrete measures for possible future ethical guidelines in dealing with Burmese amber.

1 The terms Burmese military, Burmese army, Myanmar military, Myanmar army and Tatmadaw are being synonymously used in this report.

Amber-Mining Areas in Myanmar: Geographical and Geological Settings

Fig. 1: The three significant amber-mining areas of Kaching (A, blue), Sagaing (B, yellow) and Sagaing (C, pink) regions in Myanmar, each of which is hundreds of kilometers away from the other. (Map modified from Sun et al., 2015).



There are three major mining areas in Myanmar, hundreds of kilometers away from each other (see Fig. 1). Each is in a different province, and only one, the Tanai mining area lying within the recent conflict zone. Up to 2017, the Tanai mining area was the most productive of all the mining areas. After a conflict with the KIA escalated in spring 2018, the mining area in Khamti, 120km south-west of Tanai and outside the conflict zone, took over as the major amber producer. The other major amber producing mines are those at Hti Lin, about 600km south-south west of the Hukawng Valley (Tanai). Satellite images and geographic coordinates of the mines in

Tanai and Khamti are shown in Fig. 2. Further detailed information is given in Figs. 3-11. Representative location shots of the mines are shown in Figs. 3 and 4. Fig. 5 shows the mining localities at Khamti that were mapped during the course of our own field work. Our Foundation, with the assistance of local miners, has obtained detailed sampling of profiles across the stratigraphic columns at one outcrop of each of the mining clusters, with video recordings and GPS coordinates of exact sample locations. The coordinates published by Nyunt et al. (2019) have been remeasured (see Fig. 5). Figs. 6 and 7 illustrate how important the new mining areas outside the conflict zone have become, as is evident in our drone survey. Fig. 8 shows a series of mining plots that were recently auctioned to local populations at Kyauk Tan, within the Khamti mining area. In early 2020, a small-scale mining operation at site No. 3 of mining plot No. 28 at Kyauk Tan Maw was operated with our support and supervision to ensure ethical procedures at every step of the mining process to ensure fair pay, implementation of safe infrastructure, availability of medical support, no child-labour and a pledge for remediation of the site at

Fig. 2: Satellite map showing two of the mining areas, one at Noije Bum in the Hukawng Valley near Tanai, and a newer mine near Khamti (Pat ta Bum). The newer mine is in the Sagaing Region and closer to the jade-mining area. In comparison with the Hukawng Valley mine, this mine has not experienced the same ethical concerns, and it has been spared from major conflict.



the end of the mining cycle (Fig. 8). In Figs. 9 and 10, we plotted the mines in the geological setting and separated them as “conflict” mines (old mines) and “non-conflict” mines (new mines). Both the old and new mines produce amber with vertebrate inclusions such as the lizard shown in Fig. 13B.



Fig. 3: The Pat ta Bum mine is located near Khamti, outside the conflict zone (drone picture 2019). It is approximately 120 km south-west of Tannai, and within a commercial jade-mining area.



Fig. 4: Picture of the old mine (Noije Bum), located near Tanai. This mining area was at times a conflict zone.

All the data is included here to produce a more informed picture regarding the location of amber mines across Myanmar, and their positioning relative to the area of recent conflict. The different mining areas have totally different histories with respect to conflict, with only mining area A located within the recent conflict zone, and only at certain times. Geological maps and sequencing within individual mines highlight significant variations in amber ore and specimen age, which generally stretch over the entire Cretaceous Era. The acquisition of undisclosed amber in the downstream market and their subsequent study should take into consideration these uncertainties on age constraints, as Burmese amber in the retail market can come from different mines of different ages.

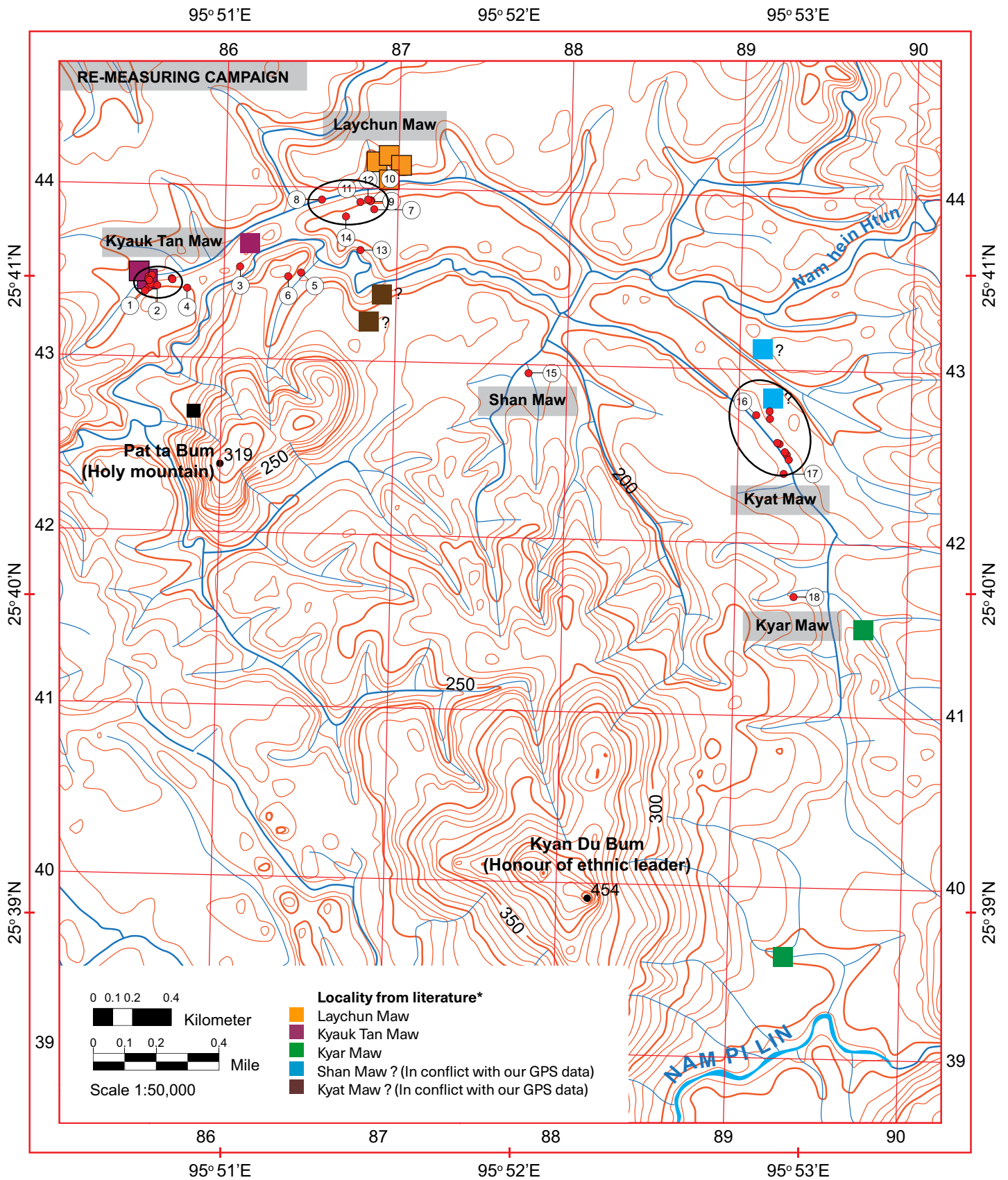


Fig. 5: Topographic map showing the major amber mine locations as mapped in the summer of 2019. Squares are mines reported by Nyunt et al (2019). Numbers 1 to 18 refer to the locations of our field work and rock sampling. Circles indicate mine clusters, with specific local names. Discrepancies in naming and/or coordinates between our measurements and those of Nyunt et al (2019) need to be revisited.

* *Thet Tin Nyunt, Tay Thye Sun, Cho Cho, Naing Bo Bo Kyaw, and Wai Yan Lai Aung. Amber from Khamti, Sagaing Region, Myanmar. The 36th International Gemological Conference, Nante, France. 2019.*



Fig. 6: Drone pictures of the mining area at Khamti (Laychun mine), which is located in the Sagaing region, outside the conflict zone of Tanai, which is in the Kachin state. The picture shows that the mining area and local population is quite considerable. This amber-mining locality gained importance after 2017 when miners from Tanai moved away to this non-conflict area.

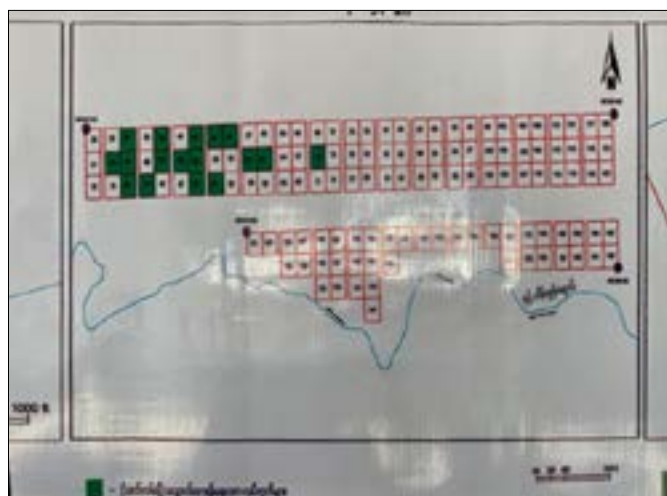


Fig. 7: Maps of mining licenses at Laychun. In 2019, mining licenses for the Khamti mining area were divided into small plots of 200 square feet, and the mining rights were auctioned to local individuals.

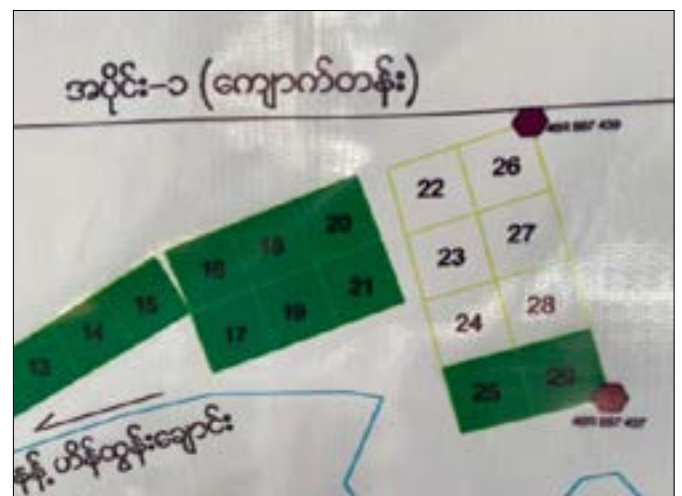


Fig. 8: Maps of mining licenses in Kyauk Tan (Khamti mining area).

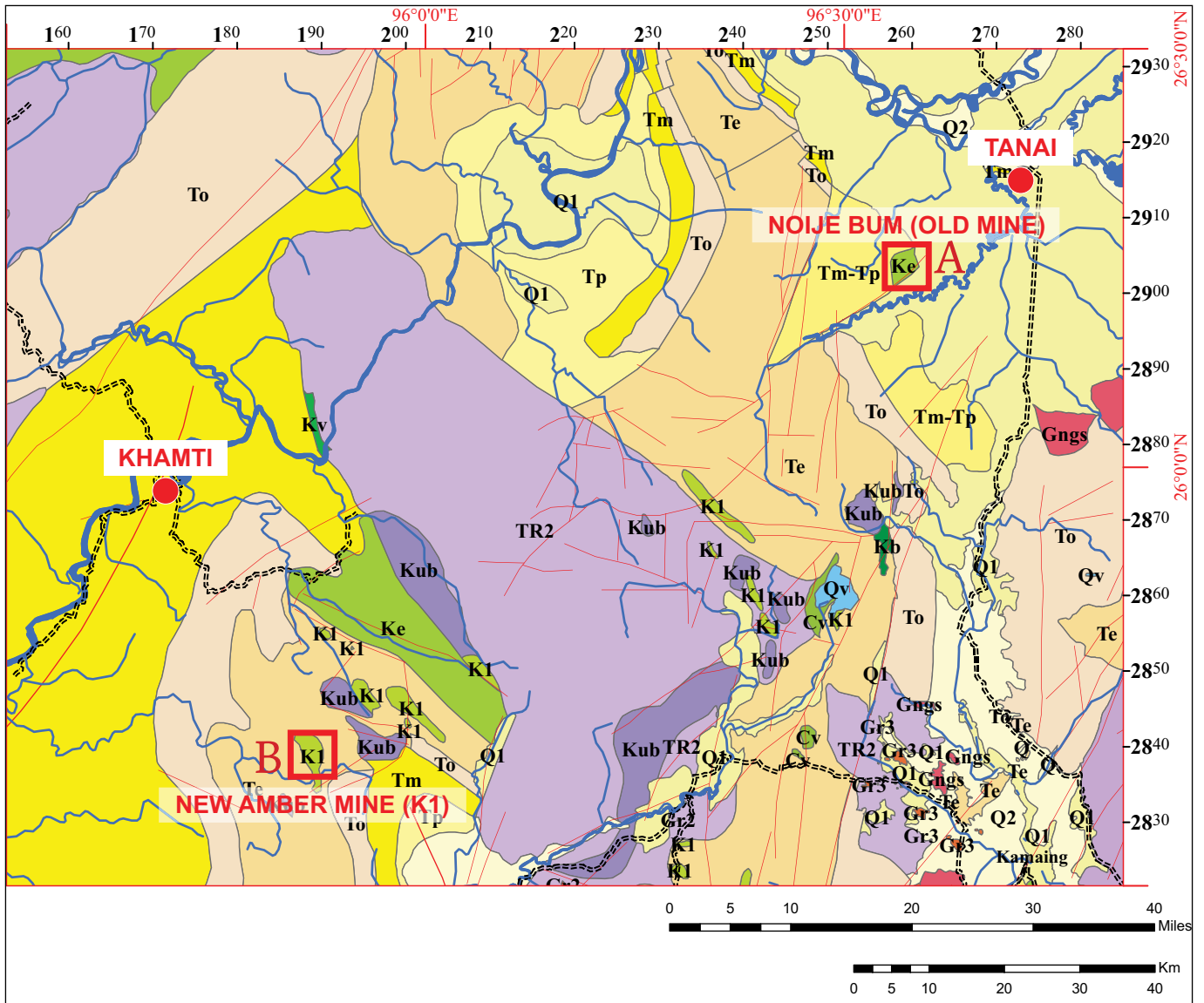


Fig. 9: Section of the Geological map of the Sagaing and Kachin area 2019, showing two mining areas; the mines A at Tanai (labelled as Old Mine) and the mining area B at Khamti (labelled as New Mine, K1). According to the official map of Myanmar, the new mines at Khamti are found in Globotrancana limestone, Orbitolina limestone, conglomerate, sandstone and siltstone. Its age is indicated as Lower Cretaceous (see legend). The old mines (A) are found in rocks that are labelled as Ke with conglomerate, sandstone, grit, shale, silicified tuff and dacite. The age of the old mines at Tanai were determined to be 99 million years old (Shi et al., 2011). On the basis of the geological map, the new mines at Khamti (B) are geologically older than the mines at Tanai (A).











Fig. 10: Approximate position of amber mines in the Tanai area (Hukawng Valley) based on our research (red).
 A Map redrawn and modified from the geological map of the Sagaing and Kachin area (Map no.83/n,83/k,83/o,83/l,83/p,92/a,92/c,92/d). B Mining activities based on erosion pattern observable in satellite images obtained from Google maps, distorted to fit the geological map coordinates and C overlapped A and B. The approximate coordinate position of the sample finding is given within the red square. The most important mines for paleontological discoveries are the Zee Phyu Kone and Aungbar mines. The coordinates of these mining areas are approximate and need to be revisited for more precise coordinate determinations.



SEDIMENTARY AND METAMORPHIC ROCKS

HOLOCENE	Q2	<i>Younger alluvium</i>
PLEISTOCENE	Q1	<i>Older alluvium</i>
QUATERNARY	Q	<i>Sand and gravel</i>
PLIOCENE	Tp	<i>Mainly composed of coarse to gritty, soft and friable sandstone with minor pebble sandstone</i>
MIO-PLIOCENE	Tm-Tp	<i>Lacustrine deposit, conglomerate, sandstone, siltstone and sand</i>
MIOCENE	Tm	<i>Conglomerates, cross bedded sandstone, grit, siltstone, sand, clay, non marine clastic sediment and limestone</i>
OLIGOCENE	To	<i>Sandstone, turbiditic sandstone, concretionary limestone, siltstone and clay</i>
CRETACEOUS-EOCENE	Te	<i>Pebbly sandstone, fine to coarse grained turbidites, chert, limestone and volcanogenic sediments</i>
CRETACEOUS-EOCENE	Ke	<i>Conglomerate, sandstone, grit, shale, silicified tuff and dacite</i>
UPPER CRETACEOUS	K2	<i>Mudstone, sandstone, turbidites, conglomerate and micritic limestone</i>
LOWER CRETACEOUS	K1	<i>Globotrancana limestone, Orbitolina limestone, conglomerate, sandstone and siltstone</i>
CRETACEOUS	K	<i>Red beds, limestone, red radiolaria limestone, volcanic rocks, volcanogenic sediments and high grade metamorphic rocks</i>
TRIASSIC	TR2	<i>Graphitic phyllites, mudstone, sillimanite schist, banded gneiss, sericitic quartzite, turbidites sandstone and mudstone</i>
TRIASSIC	TR1	<i>Mica schist, amphibolite, granitic gneiss, mudstone, sandstone, tuff, local olivine basalts</i>
DEVONIAN	D	<i>Dolomite, coral reef, black limestone, shale, siltstone, sandstone and mudstone</i>

VOLCANIC ROCKS

	Qv	<i>Basic tuff and ash bed</i>
	Cv	<i>Basalt, andesite, tuffs</i>
	Kv	<i>Rhyolite, andesite, microdiorite and basaltic dykes, tuff and volcanic breccia</i>
	Gr3	<i>Granites of Cenozoic age</i>
	Gr2, Kgd, Kd	<i>Granites, Granodiorite, Diorite of Mesozoic age</i>
	Kb	<i>Gabbro and others basic Rocks of Cretaceous age</i>
	Kub	<i>Ultrabasic Rocks of Cretaceous age</i>
	Gngs	<i>Marbles, calc-silicates, gneisses, greenschist to granulite facies, metamorphic rocks, pegmatites and quartz veins</i>
	Grn	<i>Two mica granite</i>
		<i>Fault</i>

Legend to Figs. 9 and 10

Cretaceous carbonaceous stratigraphic columns with layers of amber, ammonite and vertebrate occurrences at the new Khamti mine



Fig. 12: A vertical shaft in a 200 × 200 foot mining plot (Fig. 8) penetrated bedded carbonaceous rocks at Kyauk Tan Maw (Khamti mining area). This is a mine operated with our geological consultancy where the mine owner guaranteed total control over ethical issues.

The mines of Khamti are outside the conflict-zone of Tanai and the geology can be studied in detail. The amber appears in hard rock and the observation of amber in the stratigraphic setting is possible (Fig. 12). In a mine where we consulted as geological engineers, a 12 m vertical profile was drilled out of the hard rock (Fig. 11). This is a mine operated in early 2020 with the support of our own research group, which ensured total ethical compliance and scientific control of stratigraphy. The presence of ammonite body fossils and impressions within multiple amber-bearing layers was discovered (Fig. 13A). Such age indicators and structurally controlled findings are of high importance for paleontological research of vertebrate specimens such as an unpublished lizard located at this site, Fig. 13B, which was subsequently imaged using high-resolution microtomography. This lizard specimen was found in an amber mine that is about 120 km away from the conflict zone in the politically stable Sagaing region of Myanmar.

A general ban as initially proposed by SVP for Myanmar amber samples found after 2017 would inhibit the flow of money into the local populace, and act as a barrier to the publication of important paleontological specimens such as this lizard (research in progress). We recognize the ethical concerns regarding the conflict area in Myanmar, and encourage the establishment of strict ethical guidelines for the acquisition, sale and publication of Myanmar amber specimens from the area of conflict. Importantly, these guidelines should specify the mining localities of concern, and clarify the need for accompanying documentation when publishing specimens from these or other areas in Myanmar. The ethical mining and acquisition of amber specimens in Myanmar is achievable, as shown by the efforts of our research group, and a blanket ban of post-2017 specimens is not just unnecessary, but damaging to the local economy and field of paleontology.

Fig. 11: The stratigraphic column of a cretaceous rock suite with shales and carbonaceous beds at the Khamti mining area at location 25.68707N 95.8584E, Altitude 223m. For size comparison, see a member of our field crew that collected the samples.





Fig. 13A: An ammonite found at our own controlled mining site in Khamti (see Figs. 8 and 11) in cretaceous hard rock along with amber.



Fig. 13B: High resolution computed tomography of a lizard embedded in amber from the new mines in Khamti. The vertebrate is completely replaced by calcite, but all details of the outer skin, including eyelids, have been fossilized.



Fig. 13C: High resolution X-ray computed tomography (Imaging and Medical Beamline, Australian Synchrotron, ANSTO) of an ammonite included in amber (Joseph Bevitt). Such observations are extremely important for age constraints.

Correlation of research timing of published amber research with conflict events

A compilation of all scientific articles published on Burmese amber has been made by Ross (2020). A dramatic increase in the number of publications can be seen in the years 2017 to 2019 (Ross, 2019). We are going to show that this research cannot have been made on material produced after 2017 (see Fig. 14).

As shown in Fig. 17, the first phase of the amber trade involves mining, followed by polishing, sorting and then wholesale and retail marketing through different phases of the value chain, including the upstream, middle and downstream markets (Figs. 17 and 18).

After that, the amber reaches the customer and then the research begins. The research phase involves visual inspection and high-resolution 3D (computed tomography or CT) scanning – often imaging at synchrotron facilities (except insects that are often studied directly). The international research laboratories used for CT scans are accessed via peer-reviewed proposal mechanisms, with review and scheduling cycles that typically result in wait times of approximately half a year. After data acquisition, digital analysis, academic study, interpretation and writing, and then submission for review, followed by rewriting and then eventual publishing.

From the moment a specimen of scientific interest is found, we estimate that this entire process takes at least two to three years, until findings are published. A new time scale related to the discovery of amber species is therefore introduced in Fig. 14. As shown, the earliest material published is from 2016. Therefore, most of the papers that were published to end

2018/2019 (more than 700 in total) were on material that was mined before 2017. Most of this mining was carried out during the occupation of the Kachin Independence Army (KIA) in 2015 and 2016, or before, and not during the years of conflict of the KIA with the Burmese military. These conflicts escalated after the year 2017 (see Fig. 21 and timeline page 32-33). It is also during this period of time in 2017 when the Rohingya conflict escalated (Hunt, 2017).

CONCLUSION

The mining of amber that contributed to the finding of paleontological samples, as outlined in scientific publications, predates the conflict escalation at Tanai and the escalation of the Rohingya conflict in 2017. At the time of research material acquisitions, the mines were controlled by the KIA; the mining was not done under the control of the Burmese army.

No connection can be found between the scientific publications on amber during this time and Burmese army control of the area or the Rohingya conflict based on the timeline and mining activities.

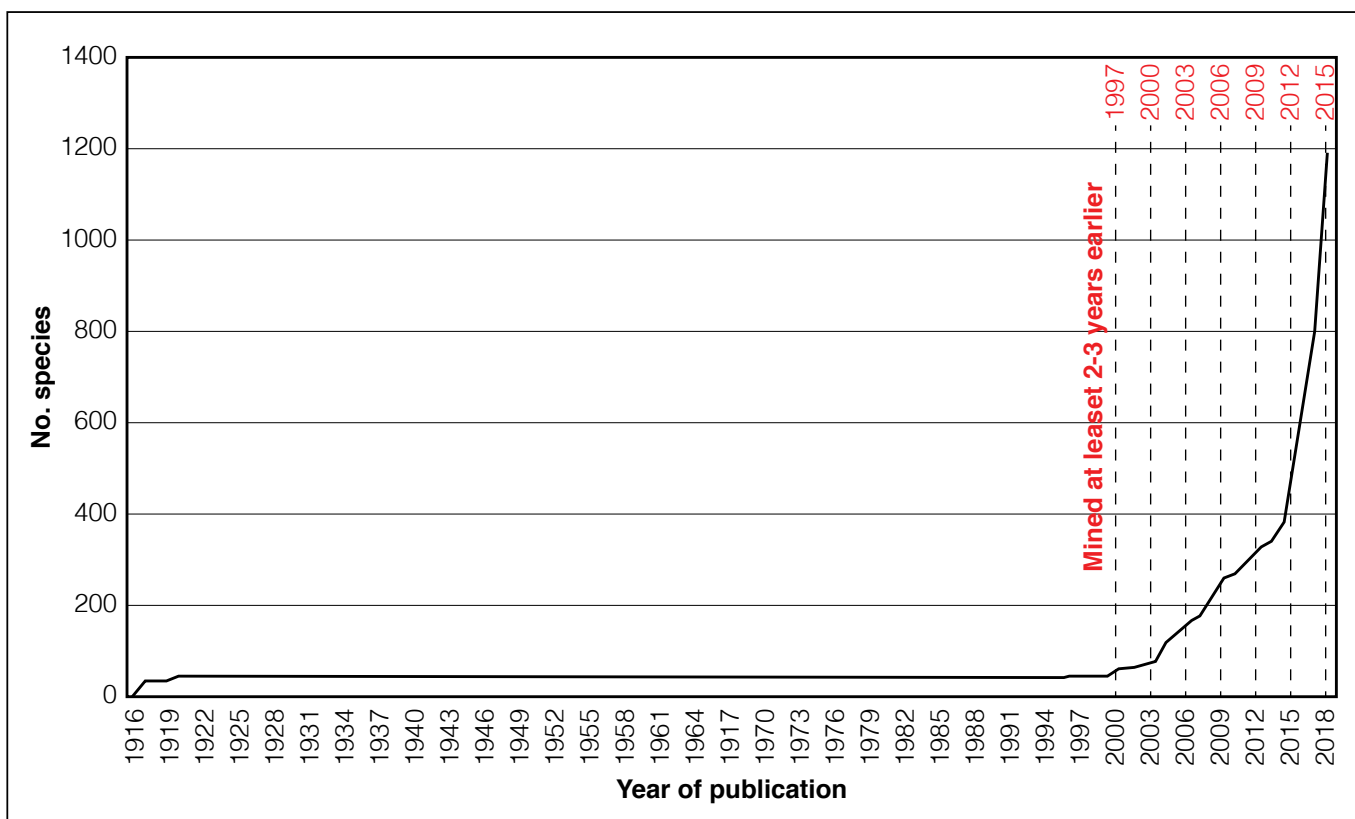
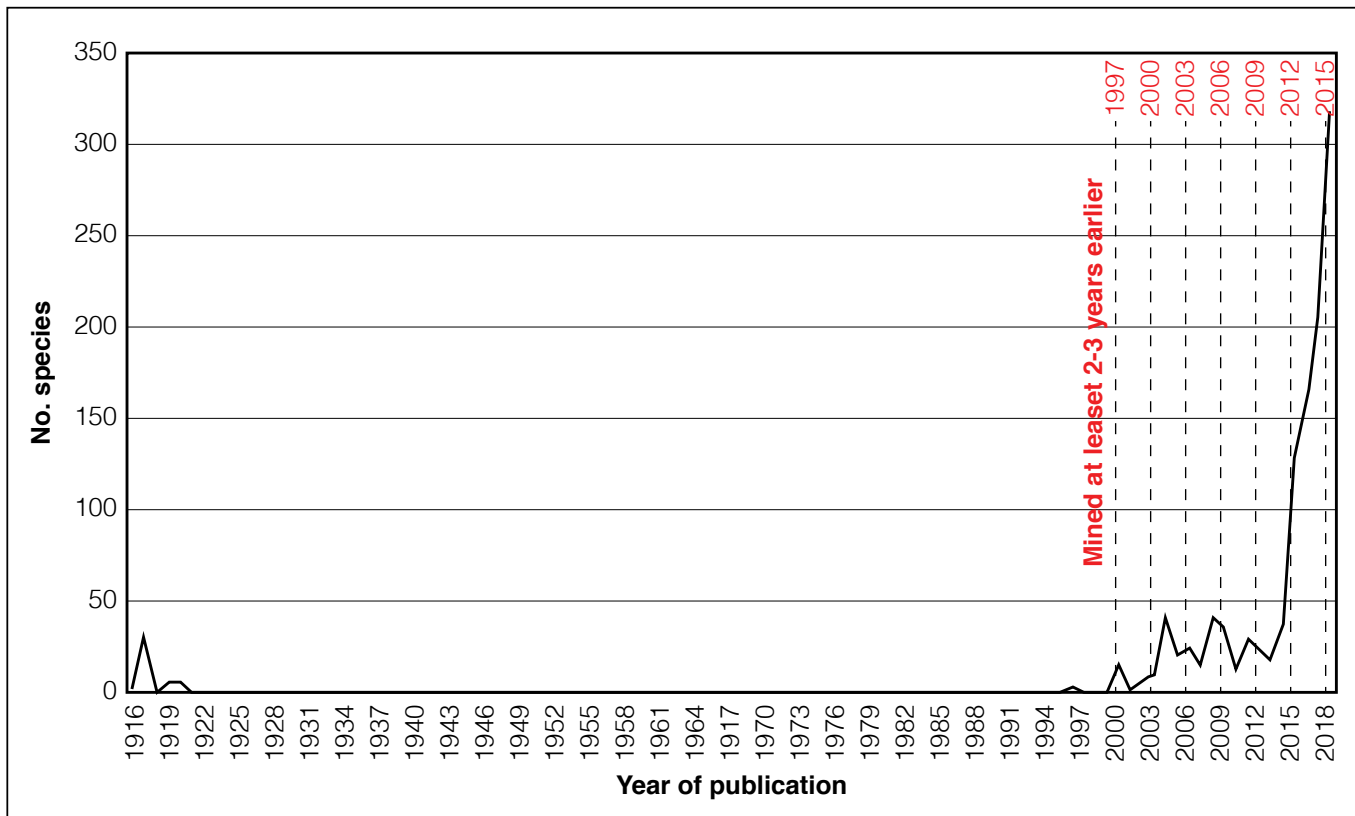


Fig. 14: The two figures from Ross (2019) are reproduced showing the number and cumulative species of Burmese amber each year. Assuming that from discovery to publication a minimum of two to three years is required, we have added a new time scale in red (top of graph). This timeline shows a good first approximation of when the material was mined, but before findings on the mined amber were published.

Estimation of amber business owned by the Myanmar Government

We have studied the amber sales of the MGE Enterprise for the period of 2015 to 2019. Our analysis of 14 auctions in this time period is illustrated in Fig. 16.

From 4768 lots of gems on offer for sales in this period of time, we found only 20 lots where related to amber sales and only 2 lots were related to paleontological samples (Table 2). Those samples were labeled as amber containing invertebrate inclusions, but no amber sales were found disclosing vertebrate inclusions.

The actual sales prices remain unknown; hence we have represented the total estimated reserve prices only in our analysis, organized geographically. However, for the purpose of this investigation, these estimated values are sufficient to reach a conclusion.

As shown in Fig. 16 the total reserve prices of gemstones sales for every year between 2015 to 2019 are less than 0.1% of the total reserve values. In absolute numbers, the total value of amber reserve value is less than US\$ 100,000 over a 5 year period, while the amount of total reserve value for gemstones is close to US\$ 100 million.

We compared these values with the revenue of the government as reported in the EITI Report for the period 2015-2016, dated 2018. Amber revenues can be found in the transparency report issued by the Burmese government (MEITI Report For The Period April 2015 - March 2016, Oil, Gas And Mining Sectors, 2018). They are summarized by different regions (Sagaing and Kachin) and by enterprise type (joint venture and private enterprises) (Table 1). Unfortunately, these revenues are not separately listed for the categories of jade, quartzite and amber. The revenue of these different type of natural resources have all been summarized into one category. It could therefore not be concluded to what extent amber sales are contributing to the high revenue figures (Table 1). In our

analysis on the amber sales by the MGE auctions (Table 3 and Fig. 16), it is indicated that the amber sales are almost negligible, at least for the account of government-run mines.

From the study of the size of the mines and sophistication of the mining operations, the major revenues are most likely accounted for by jade mining (Jade - A Global Witness investigation into Myanmar's "Big State Secret," 2015). This can be observed when comparing the jade with the amber mines operations. Amber mining is dominated by a series of small-scale mining operations. In contrast, jade mining is operated at a huge industrial scale (Fig. 23) over a vast area. The magnitude of the contribution of jade mining to the total revenues of the mining on natural resources is also confirmed by an NGO report (Jade - A Global Witness investigation into Myanmar's "Big State Secret," 2015). In Table 8 of the EITI Report p. 15, it can be seen that the sales of jade are approximately 800 times larger in revenue generation than the sales of other gems. Within the revenues generated by other gems, amber is only a very small portion. It can be concluded the revenues generated from Amber are extremely small in comparison to jade.

It is quite surprising that quartzite, jade and amber have been summarized in one category in the EITI government report of 2018. An answer for the motivation for this non-transparency may be found in the UN-HRC report. In their conclusions they emphasized that the report of the Burmese government under-reported certain revenue sectors, particularly for the jade industry. The summary of many different types of natural resources in one category is definitively contributing to a non-transparent situation, particularly for revenues regarding amber.

According to data reported by MGE, 13,483,383 carat, 23.6 tons of gems and 36,059 tons of Jade were produced in 2015-2015 as follows:

Region	Sharing/Private Production		Unit	Value	Value
Kachin State	Joint Venture	Jade	17,258,772 Kg	40,831.87	26,132,397
		Quartzite & Amber	80,319 Kg		
	Private	Jade	17,425,166 Kg	44,190.69	28,282,042
		Quartzite & Amber	343,905 Kg		
Sagaing Region	Private	Jade	944,343 Kg		
		Quartzite & Amber	6,682 Kg		
Total				85,022.56	54,414,439

The value of Gems and Jade is on the basis of the valuation made by the valuation committees. This value is used for the determination of the royalties on production.

Tab. 1: MEITI report table of page 14 exactly reproduced. Burmese currency has been estimated into Euro using an exchange rate of 1 Euro = 0.00064 MMK (15 June 2020). It is shown how the design and the summary of the different categories created a situation of non-transparency regarding revenues in Jade, Quartzite and Amber (all summarized in one account). Also, it is not possible to understand the contribution of joint venture and private separately.



Fig. 15: Front page of the catalogs of the MGE government sales that were available for this report from 2015 to 2019 (PMF library).

Catalogue of Myanmar Gems. Fifty-Second Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 24 June 2015 - 6 July 2015.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
57	Rough amber	8	350.00Gm	2500
58	Rough amber	6	2.210Kg	6000

Catalogue of Myanmar Gems. Fifty-Third Myanmar Jade, Gems & Pearl Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 24-28 June 2016.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
93	Semi-cut amber	1 Pkt	22.50Kg	2025
94	Semi-cut amber	1 Pkt	27.00Kg	2430
95	Semi-cut amber	1 Pkt	28.50Kg	2565
96	Semi-cut amber	1 Pkt	30.50Kg	2745

Catalogue of Myanmar Gems. Mid Year 2016, Gems & Pearl Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 20-29 November 2016.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
66	Semi-cut amber	12 Pkt	22.50Kg	2025
67	Semi-cut amber	15 Pkt	28.50Kg	2565
68	Semi-cut amber	14 Pkt	26.50Kg	2430
69	Semi-cut amber	16 Pkt	30.50Kg	2745

Catalogue of Myanmar Gems. Mid Year 2017, Gems & Pearl Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 12-21 December 2017.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
185	Semi-cut amber	77	13000.00	5000

Catalogue of Myanmar Gems. Fifty-Fourth Myanmar Jade, Gems & Pearl Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 2-11 August 2017.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
230	Amber faceted	6	114.00	5000
231	Amber faceted	16	163.00	5000
239	Semi-cut amber with insect inclusion	1	163.00	10000
240	Amber carving	5	508.00	5000

Catalogue of Myanmar Gems. Fifty-Fifth Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 20-29 June 2018.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
201	Semi-cut amber	23	1218.00Gm	2000

Catalogue of Myanmar Gems. Fifty-Sixth Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee, 11-20 March 2019.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
94	Semi-cut amber	1 Pkt.	1720.00Gm	2500
95	Insect-bearing semi-cut amber	1 Pkt.	93.00Gm	1000

Myanmar Jade and Gem Emporium (Myanmar Currency Only). 8-9 June 2019.

Lot No.	Description	No. of Pcs.	Weigh (Carat)	Reserv Price (€)
65	Amber faceted	1	150.00	2880
214	Roughamber	1 Pkt.	15.220Kg	832

Tab. 2: Summary of all amber lots found in 14 auction catalogs in the period from 2015 to 2019. Only 18 lots were found from more than 4000 lots. Two lots are marked with red, as they were mentioned in the catalogs as containing amber with insect inclusions (amber with invertebrate). No vertebrate-included amber were sold at Myanmar Gems Enterprise (MGE) auctions in the years 2015 to 2019. This is considered a logical consequence of the amber market structure (see Fig. 17).

Year	Amber	Other stones
2015	€8,500	€15,509,540
2016	€19,530	€40,218,182
2017	€30,000	€20,667,726
2018	€2,000	€5,954,127
2019	€7,212	€7,873,147

Tab. 3: Total estimated values of amber lots and other stones in comparison for the years 2015-2019 (see graphical representation below and Tab. 2). From MGE auction catalogs (see Fig. 15).

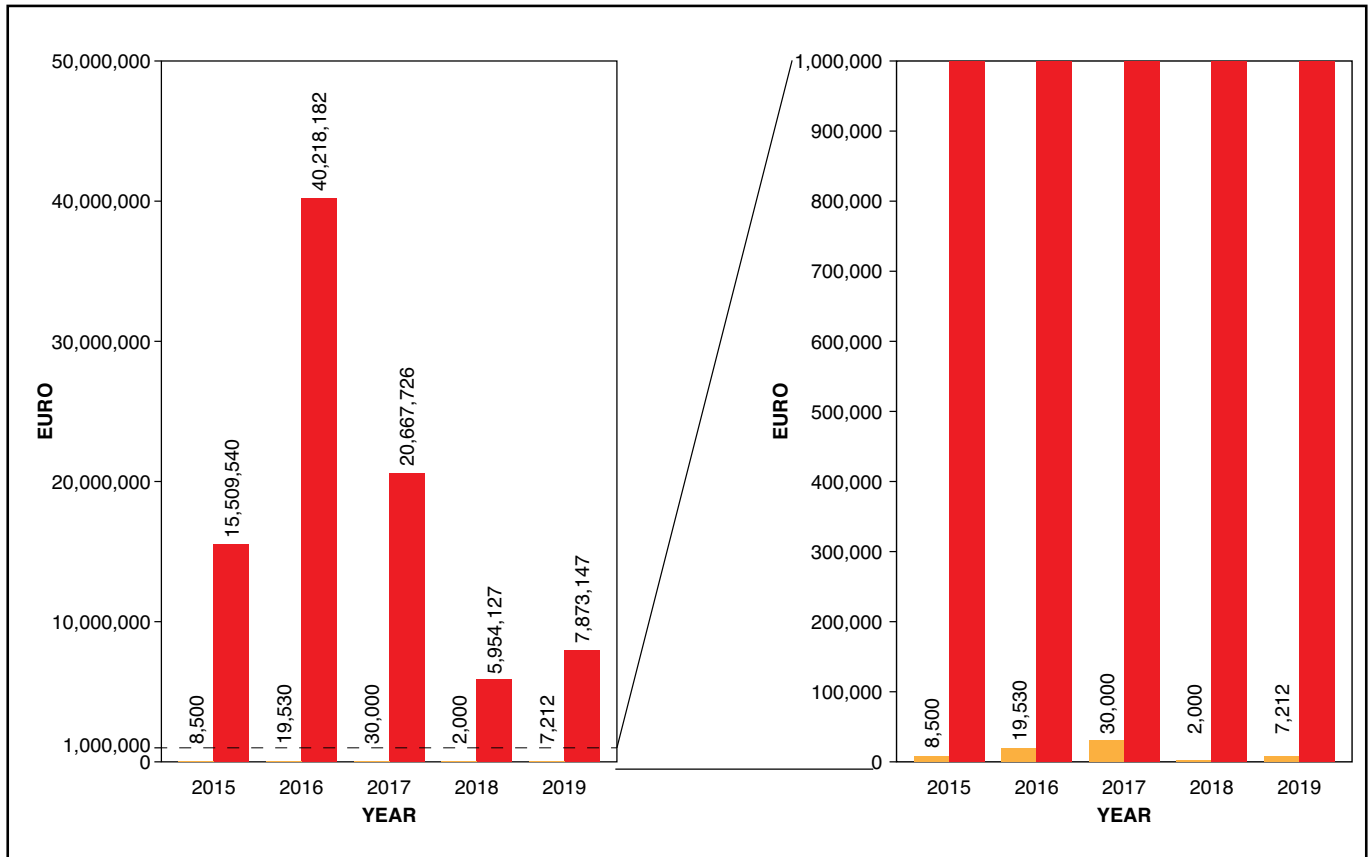


Fig. 16: This graph shows the total estimated value of gemstones auctioned between 2015 and 2019 based on an analysis of data published in 14 auction catalogues (Fig. 16). The data are not corrected for the actual sale results but based on the government estimate, and catalogues with Burmese currency have been changed into Euro Currency according to current exchange rates. These uncertainties are considered unimportant for the purpose of our analysis. The estimated value of amber is so small in relation to the general estimate that we had to enlarge it in a second graph. As can be seen, the total estimated value of the amber is 67,342 euros, and the total estimated value of the gemstone is over 90 million euros. The percentage of amber among total gemstones is 0.07%.

The amber mining market structure compared with the world's diamond market

As shown in Figs. 17 and 18, the amber market is discussed in relation to the diamond industry (Bain Report, 2013). The diamond market can be divided into the upstream, middle and downstream markets, each of which has its own characteristics and varying types of revenue flows. We have compared the amber market with the diamond market in and have divided the amber market into two distinct categories: the jewellery market and the collector market

A.) THE AMBER JEWELLERY MARKET

The majority of amber production goes to the mainstream jewellery manufacturing industry, and the material is sorted by preferred colors (e.g. so-called blood amber), and clarity. It is then cut into beads and carvings, and jewellery pieces comprising bangles and necklaces are produced and later sold in the mainstream market (see Appendix 23). A large portion of the IDP camp population in Myanmar's conflict area is involved in middle-market processing of the jewellery with the assistance of the polishing industry (see Fig. 18 and Appendix 24). Finished amber is relatively inexpensive compared with diamonds (approximately 100 to 1,000 times cheaper per carat weight). While a 50-carat amber piece may cost US\$100, an amber piece of the same material and quality containing a vertebrate inclusion may cost upward of US\$10,000 or more. These pieces follow a completely different market chain than the jewellery market chain, as discussed below.

B.) THE AMBER COLLECTOR MARKET

Without the presence of a jewellery market, the amber collector market cannot evolve. This collector market is characterized by identification of paleontologically important samples during the jewellery manufacturing process (during polishing or during retailing in the downstream market). The amount of amber found to contain fossils is relatively

small. For example, according to our experience, only one vertebrate lizard is found in every one- to three-million polished pieces. Discoveries are non-systematic, and this market cannot be controlled by a mine-to-market integration because it is not known which mine will produce extraordinary findings.

The collector market is a niche market that has established itself as an erratic middle-to-downstream market (Fig. 17). The takeaways are not regular, as they are in the amber jewellery manufacturing market (Fig. 18), but are dependent on the availability of experts (see Appendix 26). It is a competitive market that can be occupied by both unethical and ethical players. A middle-market discovery would usually be made by somebody involved in the polishing process, for example by an IDP camp polisher (see Appendix 24). A paleontological discovery can also be made in the downstream market during open-market sales, as has been reported in the available literature. Dealing in such pieces requires compassion and expertise (see Appendix 26). It is the perfect competitive market that can be exploited through the positive approach of supporting ethical players against non-ethical ones – the approach recommended in the UN-HRC report.

Box 1: The middle market is fragmented and most players are small, family-owned businesses. The typical player in the specialized amber market is magnitudes smaller, although this market, too, is fragmented. For example, much of the polishing operations can be found in the IDP camps at the amber mines. It was noted during our field trips that the amber market creates jobs in specialized family-owned operations. These jobs require specific skills, such as using a microscope, loupe, special illumination techniques or immersion liquids. People involved in such specialized operations also need to study available literature in order to recognize new species. This specialized amber business offers great opportunities for the paleontological community to support transfers of knowledge to underprivileged indigenous groups in the amber-mining area, and also to support them financially by acquiring material for collections.

Box 1: Characterization of the middle market of a specialized part of the Burmite amber industry (Amber with vertebrate inclusions)	
	Family owned businesses with turnover less than 100,000 US dollar
	Need direct access to amber productions from small scale miners or auctions
	Typically situated in polishing centers such as in IDP camps
	Agents may be IDP camp specialists or market agents specialized in discovery of invertebrate or non-invertebrate
	No vertical integrated market (due to scarcity of discoveries)
	Paleontological specialists or experts with 10-15 years of experience
	Travelling agents geographically diversified.

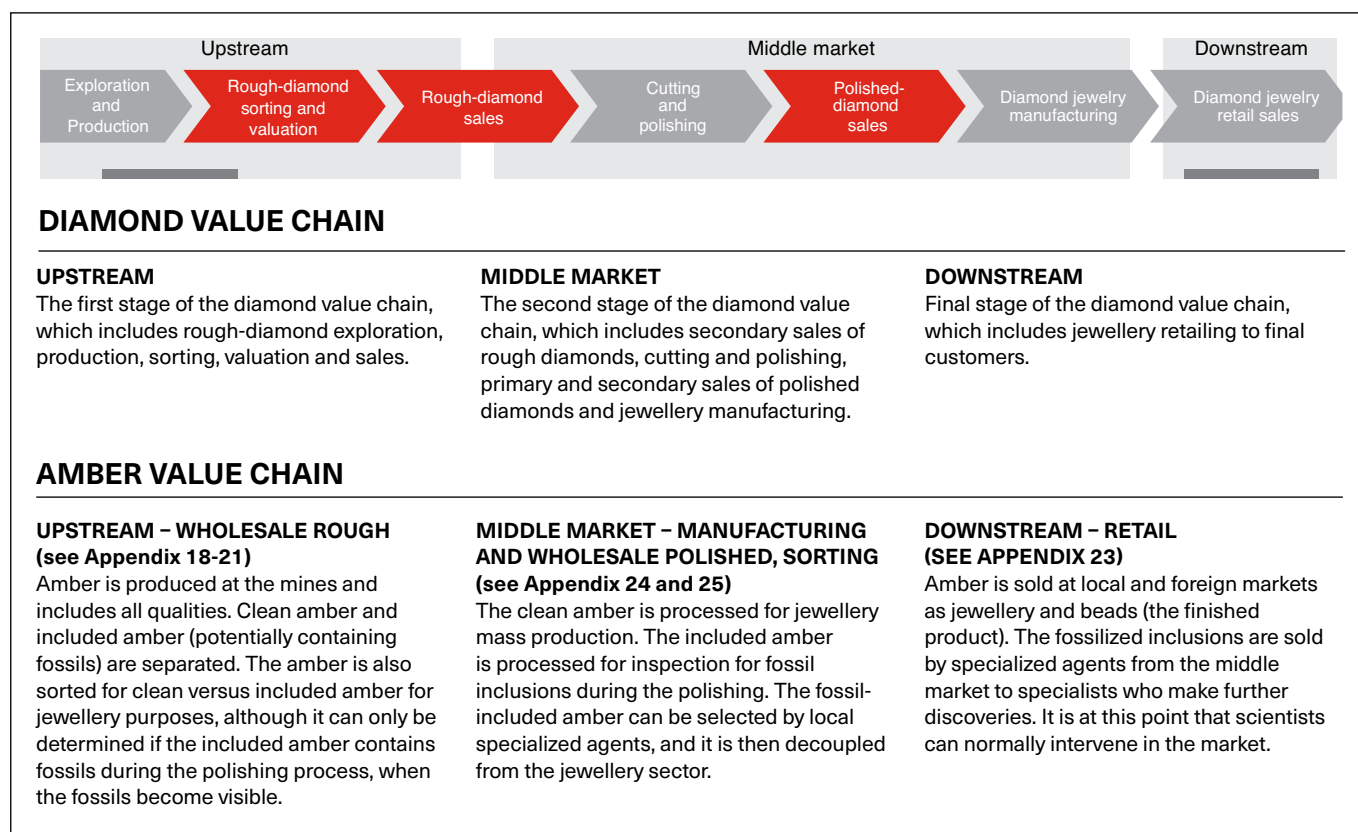


Fig. 17: A comparison of the diamond market chain (from Bain report, 2013) and the amber market chain.

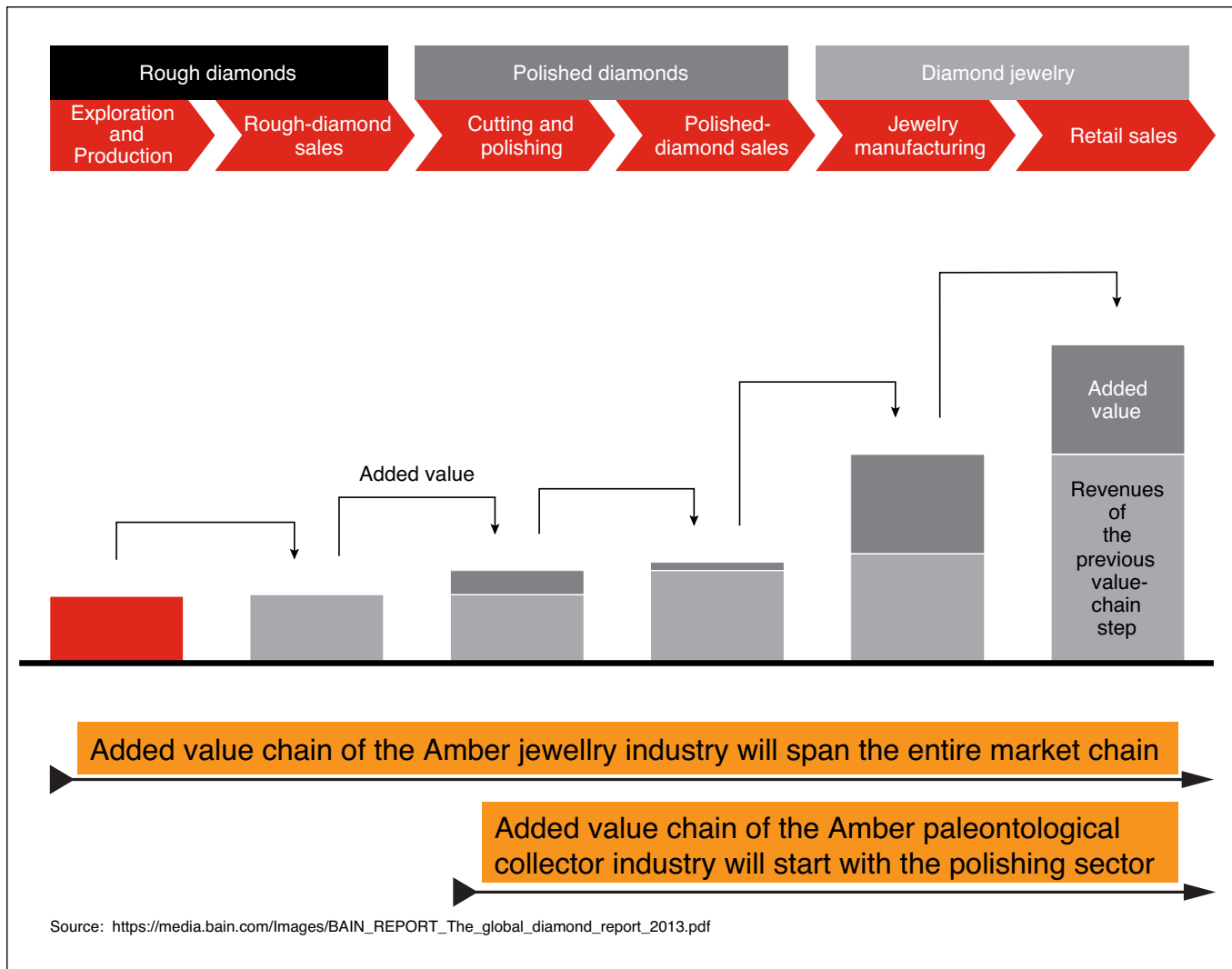


Fig. 18: The added value chain in the Diamond industry (example 2013) in comparison to the Amber industry

The diamond market and its typical added value elements. The amount of added value depends on the position in the market chain. Large takeaways in the diamond industry are typically made during the mining stage. Higher added value comes in with the last stage of the middle market during jewellery manufacturing and retailing.

In the amber market, by comparison, two different elements on the added value chain must be considered. The amber jewellery sector has relatively small but regular takeaways at every level of the market chain. It is these sources of income that keep a mining operation running. A second added value chain is possible during the middle and downstream markets. However, the discovery of fossilized inclusions provides a huge possibility for added value. Due to their scarcity, however, such findings are not a major contributor to the total amount of added value created, but they do represent a welcome bonus for educated players in the polishing industry.

The location of valuable material in a conflict zone, such as amber in Northern Myanmar, raises ethical questions with scientists

* July 9, 2017: the military drops leaflets in the mining area to warn the people to leave; January 30, 2018: the Burmese military bombs the amber mines; March 2019: a ceasefire is put in place to end the conflict and a peace agreement between the KIA and Burmese government is reached (see timeline page 32-33).

In 2017, GemResearch Swisslab AG (GRS) staff on a humanitarian mission to the amber-mining area of northern Myanmar were confronted with an escalation of the conflict. In mid-2017, the Myanmar Army dropped leaflets over Tanai township, an area including amber mines under the control of the Kachin Independence Army, ordering local residents to evacuate. Anybody remaining in the area, including miners, would be considered as enemy combatants. In January 2018, the Myanmar military started to carry out airstrikes and heavy shelling in areas near amber mines.

Among other locations, Awng Lawt, a village of about 400 homes close to the KIA's Brigade 2 headquarters and inhabited mostly by farmers and miners, was targeted. Fighting between the Myanmar Army and the KIA intensified in area. Some people managed to reach safety in Myitkyina (Kachin State's capital) but thousands were trapped in the conflict zone and forced to hide wherever they could.

GRS made two decisions: the first to assist as much as it could in helping Internally Displaced Persons (IDPs) trapped in the jungle and in the surroundings of an old Christian Baptist church and whose fate had become extremely precarious, and second to continue amber acquisitions only from indigenous people and agents of the IDP camps.

Such a humanitarian operation had to be organized in total confidentiality as international humanitarian organizations were initially not allowed to step foot in this area. It took some time for representatives of a few non-governmental organizations (NGOs) and United Nations agencies to access these IDPs camps (see Appendix 16).

From late April 2018 onward, GRS (and the Peretti Museum Foundation) through the discrete and efficient mediation of local citizens, managed to funnel funds to the conflict area that were used to provide for relief personnel and equipment including medicines, tents, bamboo, food,



Fig. 19: An example of our humanitarian activities in the IDP camps in the Tanai area. The picture shows children in the area receiving raincoats in June 2018.

clothes, blankets, plastic sheets, cooking material and water pipes. With that aid, Kachin community and religious leaders developed four projects scattered over the region aimed at sheltering and providing basic needs to thousands of IDPs, including those in Trinity Hpyen Yen Babang IDP Camp (August 2018), Hkalup Hpung Nawku Hting Nu Baptist Church, and other IDPs in Tanai township (June 2018) (see Appendix 6, 9, 12, 13, 14, 15 and 16 and www.pmf.org/ethics). A timeline of events is outlined in page 32-33.

During this time, a veritable cutting industry developed in the IDP camps. Photo documentation about the different events, the IDP camps, the mining and the cutting industry has been attached in the Appendix 24 and 25.

KIA is an ethnic group who in 2011, after 17 years of cease-fire (signed in 1994), resumed an armed conflict against the central government in order to claim a wider degree of autonomy within a future federal nation.

AN INCURSION INTO AMBER MINES: A GRS DELEGATE VISITED THE TANAI AMBER MINES A FEW DAYS BEFORE THEY WERE BOMBED

In February 2018, a representative from GRS managed to reach the amber mine area in Tanai township. After landing in Myitkyina, the delegate made a six-hour road trip (approximately 100 miles) to Tanai city. It took another five hours (including a three-hour boat ride on the Nam Kwan Chaung River) to reach Zee Phyu Gone in a mining area controlled by the KIA. Zee Phyu Gone is a typical mining camp with markets, food stalls and equipment stores. The supply of these items is auctioned to the highest bidder by the KIA, who also disperse mining licenses and work permits to general supply workers, miners and mine owners. The GRS delegate learned that mining licenses for the most productive locations were granted to Chinese citizens who had crossed the border under the KIA's supervision. Kachin, Burmese and other locals were granted lesser quality spots.

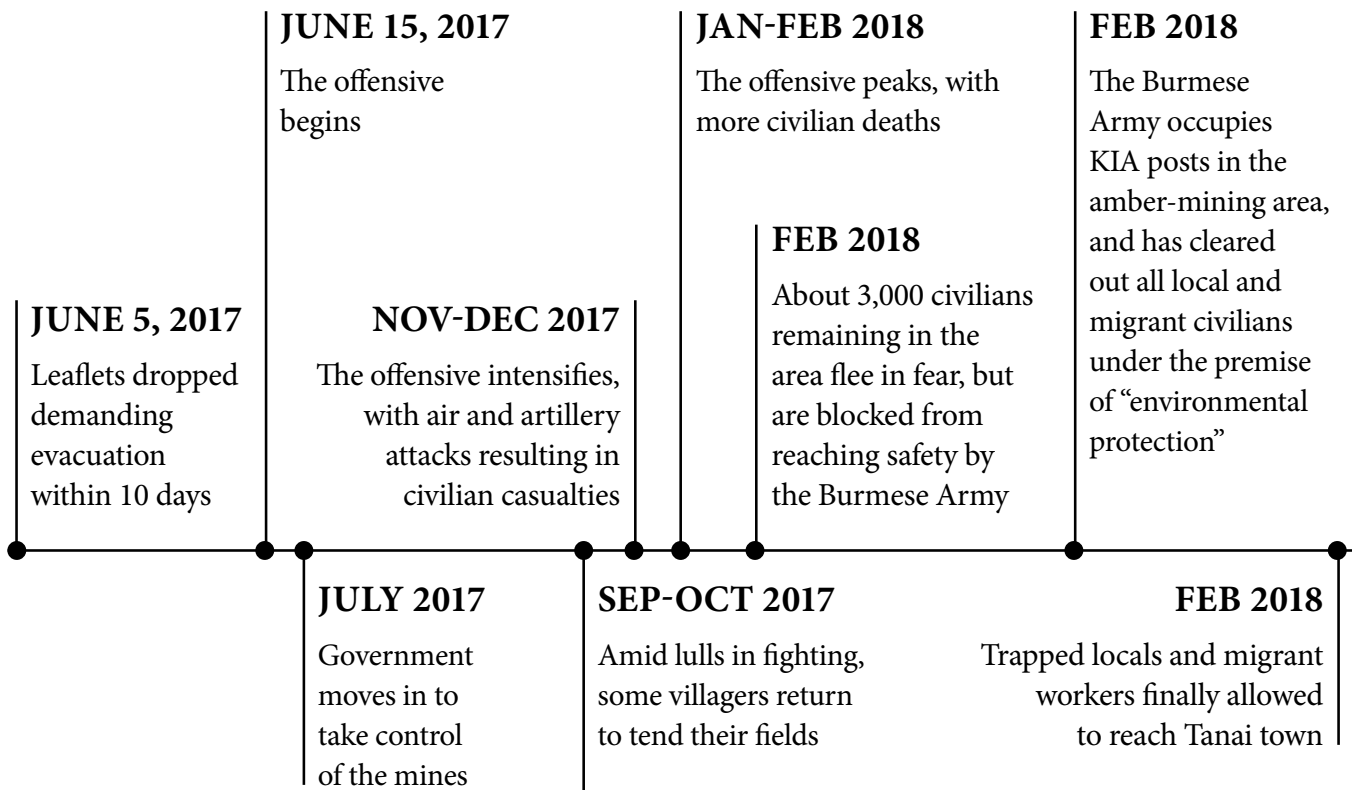
Due to the intensification of the conflict between the Myanmar Army and the KIA, the population in Zee Phyu Gone dropped from 100,000 to 20,000 people in less than five years.

The actual mining sites, comprised of hundreds of digging spots, are a two-hour walk from the main camp. Miners and visitors are forced to stop at several check points manned by the KIA, where weapons, cameras and mobile phones are confiscated and work permits checked. Amber traders are requested to stay at the camp.

On the way out, traders' amber acquisitions have to be shown at the checkpoints before they reach Zee Phyu Gone camp (see on map Fig. 9), where auctions are organized in the presence of the mine owner, buyers and a KIA representative, who collects a tax. To prevent amber being smuggled out of the official route, the whole area is protected by landmines placed by the KIA.

Hukawng valley offensive: a timeline

Source of timeline from Ji, 2017, updated and modified with additional information (marked in color)



OCT 2018

Displaced villagers write an open letter to the president protesting the granting of mining rights in their home area to outside interests and asking to be allowed to return home

TODAY

To date, no action has been taken and refugees remain trapped in limbo, more than one year after they were told to evacuate their homes

JUNE-JULY 2018

Mining resumes in the Hukawng amber region

APRIL 2018

The offensive spreads: the 300 households of Awng Lawt village are forced to flee

SEP 2018

Local MPs request legalization of mining, legitimizing central government control of all amber production

FEB 2018 - TODAY

The Myanmar government denies the existence of any IDPs

6 MAY 2018

Support is given to IDPs at Trinity Church (fleeing from Ingyan township)



22 JUNE 2018

Supplies of rice, cooking oil, salt, raincoats, medicines and cooking utensils were given at Tanghphe Church at Myit Sone Confluent Junction



11 AUGUST 2018

Vaccinations of IDP children are offered and an infant nutrition program was given to IDPs at Trinity Church (outside of Myitkyina)



MAY 2020

Myanmar military officials hand over COVID-19 prevention material, masks and medicine to KIA at Nasamyar village near Laizar town (Wanna, 2020).

Myanmar military allows mining at Zee Phy Gone mine for locals in order to ease economic hardship during COVID time.

GRS HUMANITARIAN ACTIVITIES

Hi Adi, Greeting from Myitkyina,

I visited 2 IDPs at Baptist Church and Kachin Youth Education centre outside of city (No Save zone). New 500 people flee from Awng Lork village, Tanai area and stay at Jaw Masat Baptist Church temporarily at the moment. Total flee people are over 3000 now 4 different IDPs. Vacines and Education sector control by government directly at single IDPs. So I passed 2 K to Pastor from Trinity Church. He will provide nutrition fact for children instead of vacines.

Unedited E-mail from local gemologist from the mining area: 13 July 2018

Myanmar:

New displacement in Kachin (April 1 - April 29, 2018)

Fig. 21: Map from KDNG (Ji, 2019) with amendments. Locations mentioned in the Human Rights Council Report are shown in red squares. Note that the atrocities mentioned at Hpakant are located in the jade-mining area. Atrocities that occurred near Tanai and Noije Bum are in the amber-mining area. It is evident that mining occurred during the time the KIA was present in the area. The miners were moving into the IDP camps in Tanai, where PMF has been aiding refugees since 2018 (see picture in Appendix 5-11 and Fig. 33 and www.pmf.org). A considerable part of the population entered into IDP camps (outlined with blue circle). Amber mining production suffered a huge decrease in the years after 2017 at Noije bum and moved to the Hpakant area, near Khamti (Ji, 2019, modified).

The author's humanitarian projects are shown in the map. They were concentrated in mainly 3 different areas:

1. The Trinity Baptist Church outside of Myitkyina for people fleeing from Injyangyang township.
Note: Injyangyang is not amber mining area.
2. The Myitsone RC Church at the Confluent Junction (for people flee from Injyangyang township).
3. Near Tanai at the Baptist Church (for internal displaced people fleeing from the amber mining area).

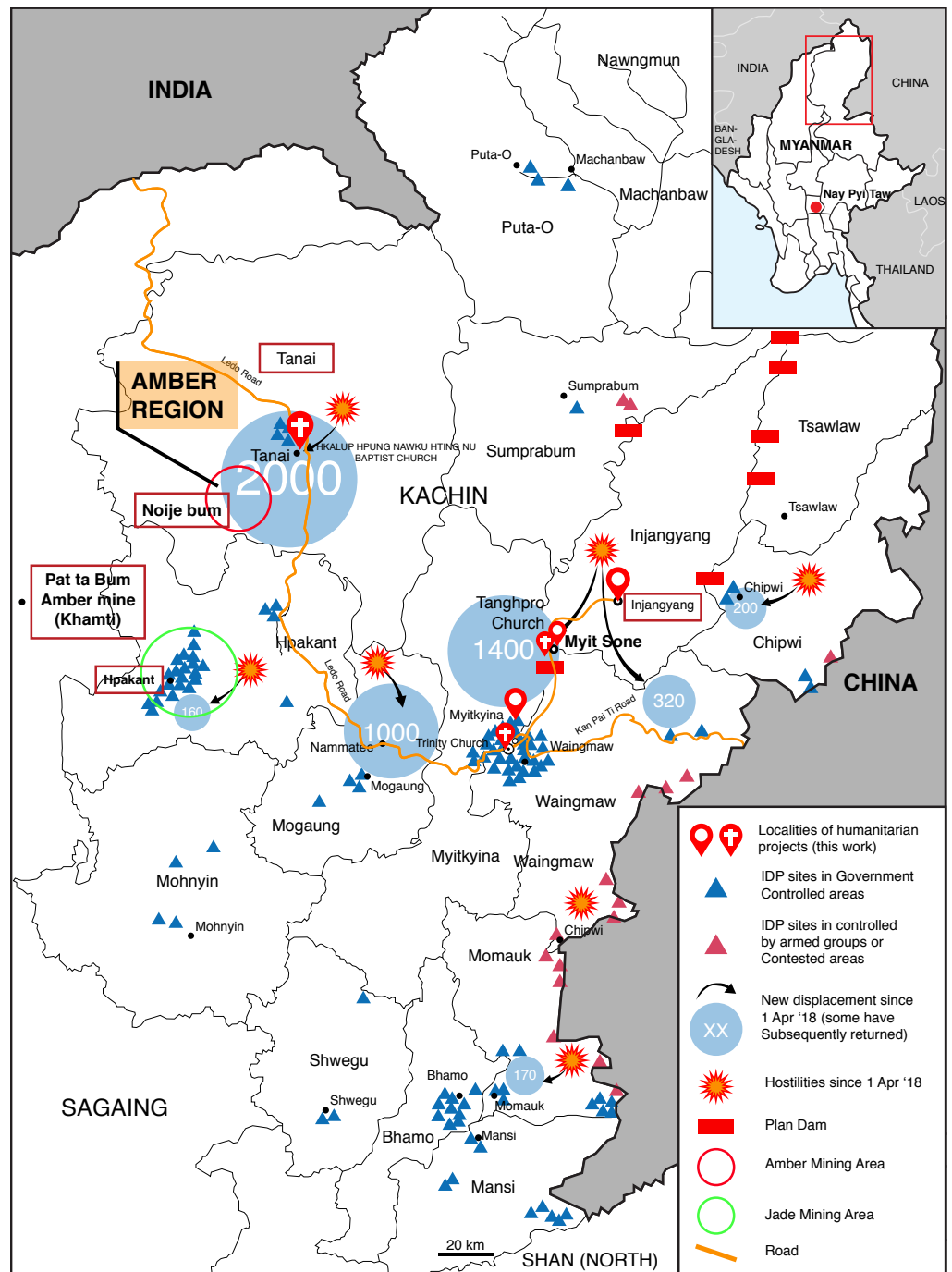




Fig. 22: TOP LEFT A pier along Nam Kwang Chaun River that goes to the amber mines area.
Fig. 22: TOP RIGHT AND BOTTOM Miner's shelters and digging sites at an amber-mining area in Tanai township. 2018, GRS.

Review of the U.N. Human Rights Council report* for the purpose of establishing the correct position in dealing with amber from Myanmar

WARNING:

Humanitarian Atrocities described in this chapter may be found disturbing

UN-HRC

(*U.N. Human Rights Council, forty-second session, September 9-27, 2019, Agenda Item 4, Human rights situations that require the council's attention. The economic interests of the Myanmar military. Independent International Fact-Finding Mission on Myanmar (A report to the United Nations).

The report finds that although the National League for Democracy under the leadership of Aung San Suu Kyi won the Myanmar elections in 2015, the “ability of the Tatmadaw (Myanmar military) to draw upon alternative sources of revenue, outside the official military budget, contributes towards it operating without a civilian oversight” (Page 3, Report of the independent international fact-finding mission on Myanmar, 2019)

The report says that under the constitution, the Burmese military is an autonomous institution free from any civilian control and oversight. Its alternative sources of revenue are used in grave human rights violations that are described in the report. The report goes into detail about the alternative sources of revenue and explains the structure of the businesses of the Burmese military through various conglomerates, holdings and economic cooperation, and elaborates in detail the persons and entities involved, including 106 different businesses from construction and gem extraction to manufacturing, insurance, tourism, and banking – in addition to a further 27 businesses closely affiliated through corporate structures.

“The revenue that these military businesses generate strengthens the Tatmadaw’s operations with their wide array of international human rights and humanitarian law violations,” the report says, citing *“strong links to a number of private Myanmar companies and conglomerates,”* which it refers to colloquially as *“crony companies.”* (Page 4, Report of the independent international fact-finding mission on Myanmar, 2019)

“Human rights violations, including forced labor and sexual violence, have been perpetrated by the Tatmadaw in mining areas, particularly in Kachin state, in connection with their business activities,” the report adds. (Page 4, Report of the independent international fact-finding mission on Myanmar, 2019)

In particular, the report mentions numerous licenses handed out for jade and ruby mining to private companies and persons who warrant prosecution for various offenses, including crimes against humanity.

One of the demands of the report is that the military must be put under civilian control and oversight through the adoption of necessary laws and policies, including the amendment of the Myanmar Constitution. The

report also calls for sanctions on military-run businesses and subsidiaries and recommends that these sanctions be enforced *“in a manner that respects human rights and gives due consideration to any negative socio-economic impact of such sanctions on the civilian population.”* (Page 5, Report of the independent international fact-finding mission on Myanmar, 2019)

The report also recommends an international coalition to resolve the problems in Myanmar: *“The findings in this report provide a clear pathway forward for the Government of Myanmar, United Nations Security Council, Member states, relevant regional and international inter-governmental organizations, investors and businesses, international financial institutions, and the United Nations, its funds, programs and agencies to implement this recommendation.”* (Page 5, Report of the independent international fact-finding mission on Myanmar, 2019)

It also calls on businesses not to work with the military, saying that *“given the global reach of Myanmar’s jade and ruby trade, the involvement of the Tatmadaw (Burmese military), the involvement of the Tatmadaw in its extraction and the Tatmadaw’s responsibility for human rights and international humanitarian law violations perpetrated in mining areas, businesses should ensure they are not contributing towards, or benefiting from those violations. In parallel, investment in the private sector, whether by private businesses or international financial institutions, should prioritize supporting the growth of alternative economic actors to the Tatmadaw and associated businesses.”* (Page 6, Report of the independent international fact-finding mission on Myanmar, 2019)

The report provides extensive details on the corporate holdings of the military, alleged subsidiaries including jade and ruby mining companies, and includes a list of donors to the Burmese military and details of their donations. The report also outlines the military’s foreign joint-venture partners, foreign companies with contractual or commercial ties to military operations, and arms and military equipment suppliers to the Burmese military. The report makes clear the military’s quest to run a budget outside the control and oversight of the civilian government.

On page 14, the report says under *“Responsible business policies and practices”*: *“Domestic and foreign companies engaging with the Tatmadaw should apply relevant international human right principles and safeguards as a matter of the corporate responsibility to respect human rights.”*

The report goes on to explain how this should be interpreted, citing policies recommended by the OECD: *“The Organization for Economic Co-operation and Development (OECD) also emphasizes the importance of businesses putting in place policies and procedures that, on a continuing basis, proactively and reactively, ensure businesses that do not contribute to human rights violations and other risks in countries such as Myanmar. This is especially relevant for Myanmar’s extractive industries, particularly the jade and ruby mining industry. The OECD Due diligence Guidance for Responsible Supply Chains of minerals from conflict/Affected and High-risk Areas (Due Diligence Guidance) provides a five-point due diligence framework that urges companies to establish strong company management systems that can*

implement and communicate due diligence policies and procedures, identify and assess risk in the supply chain; design and implement a strategy to respond to identified risks; carry out independent third-party audit of supply chain due diligence at identified points in the chain; carry out independent third-party audit of supply chain due diligence at identified points in the supply chain; and publicly report on supply chain due diligence.” (Page 15, Report of the independent international fact-finding mission on Myanmar, 2019)

The report adds: “The Due Diligence Guidance recommends specifically that businesses evaluate whether there are any forms of torture or cruel, inhuman and degrading treatment imposed for the purposes of mineral extraction; any forms of forced or compulsory labor; child labor; other gross human rights violations and abuses, such as widespread sexual violence on mine sites or in the course of mineral extraction; war crimes or other serious violations of international law, crimes against humanity or genocide.” (Page 15, Report of the independent international fact-finding mission on Myanmar, 2019)

The report on Page 30 also outlines the role of the Myanmar military in the extractive industry in the natural resource-rich states of Kachin, Shan and Rakhine. It also details violations of international human rights law and international humanitarian law that were committed within the context of the exploitation of natural resources and other projects.

It also cites interviews with torture victims of the Burmese military, saying the torture was carried out *“because the Tatmadaw wanted information on access to mines located in areas controlled by the Kachin Independence Army (KIA).”*

“Victims and witnesses of hostilities in Tanai Township, Kachin State, in 2017 and 2018 said that the overall objective of the Tatmadaw operations was to destroy the KIA’ economy by appropriating amber and mining resources under KIA control,” the report adds. (Page 30, Report of the independent international fact-finding mission on Myanmar, 2019)

On Page 56, it reports that *“In January 2018, the Tatmadaw carried out airstrikes in Tanai, Kachin State, in which civilians were killed and property was destroyed, causing displacement and destruction of livelihoods. The Mission received credible reports that the Tatmadaw used Mil Mi-35 helicopter gunships in the attack.”*

The report goes into great detail about the Burmese military’s involvement in jade and ruby mining in Kachin and Shan States, especially in Tanai Township: *“Since November 2017 the Tatmadaw and the KIA have engaged in armed conflict around the amber and gold mines near Noiye Bum Hill, south of Tanai town, resulting in civilian casualties. Additionally, the Mission documented civilians being abducted in to forced labor in Tanai by the Tatmadaw in 2016.”* (Page 32, Report of the independent international fact-finding mission on Myanmar, 2019)

It goes on to report a case of rape of a female miner in an amber-mining area in 2016 and the payment of bribes to local Tatmadaw soldiers bribes to gain access to amber and gold at the Pha Ka mine in Ting Kawk village near Noiye Bum Hill (Page 33, Report of the

independent international fact-finding mission on Myanmar, 2019).

The report added: *“Another person described working in Tanai for a company called Season Star (also referred to as Sea Sun Star), and how the company bribed a commander of the Northern Command to secure its mining license. Season Star (or Sea Sun Star) is one of the main mining companies operating in Tanai”* (Page 33, Point 91).

Although the report mentions Sea Sun Star as having been involved in bribery, it is not on the list of companies seen as contributing to human right abuses. The U.N. Human Rights Council obviously had reasons not to list this major amber-mining company in Tanai in the enterprises that must be banned to deal with.

GRS’s network of scientists and consultants in the area indicated that Sea Sun Star received permission to start amber mining in 2006, and after a series of interruptions continued do so after 2010. Sea Sun Star is described as the main amber-mining company in the Khamti area after 2017, and is also involved in direct investments.

The report also details the Burmese Army’s human rights violations in the Namyang mining area, near Tanai Township: *“Tatmadaw soldiers abducted civilians for forced labor to mine amber and subjected them to physical and sexual violence. One witness described how in November 2016 the Tatmadaw took five men by force to work for the Tatmadaw in Namyang amber-mining area. One woman had also been abducted for forced labor at the amber mine, and her son was taken into the forest in the mining area by two Tatmadaw soldiers. She told the Mission, ‘They something very bad to me. They harassed me. They slapped me. They threw my son back to me after they were finished.’ After she was raped by one Tatmadaw soldier, the other said it was his turn. She told the Mission, ‘I think he did not finish me off because my son was crying.’”* (Page 33, Point 92)

The report outlines how gold, jade and ruby mining operations in Kachin and Shan States contributed significantly to the enrichment of the military. Amber does not appear in an assessment of the most prominent money-generating businesses (Pages 33-36). However, on Page 21, under the revenue section (Point 56), amber is mentioned: *“Much of the funds generated through MEC and MEHL bypasses formal government channels, with indications that billions of USD in government \revenue from oil and gas, copper, jade, rubies, amber and the forestry sector remain unaccounted for.”*

The report’s ultimate assessment of the Burmese military in relation to the gemstone business reads: *“The Mission concludes on reasonable grounds that the Tatmadaw’s business and military interests in the jade and ruby extractive industries benefited from and directly contributed to international human rights violations in conflict-affected are in Kachin State.”*

It adds: *“The mission also finds specifically that hostilities around Hpakant and Tanai Townships in Kachin State are inextricably linked to the natural resource economy in these areas. The Mission documented numerous accounts of fighting taking place at or around mining areas, with the parent objective of the parties to the conflict obtaining control over the resources or destroying their adversary’s economy.”* As seen on the map in Fig. 2, Hpakant is located



Fig. 23: Jade mining sites in Lone Khin Village in 2017

Source: Photo exhibition, *Journey of the blood jade* by Ko Xaw (Pharkant), Soe Win Nyein, Zaw Moe Htet, Nyan Hlaing Lin. Yangon Gallery, Yangon, Myanmar. 16th - 18th May 2018

in the jade-mining area, whereas Tanai is close to the amber-mining area.

The legal findings include the following suggestions: *“The Mission also found reasonable grounds to conclude that any extractive industry business seeking to do business or doing business in Kachin and Shan States should fulfill their responsibility to respect human rights by not contracting with Tatmadaw-related businesses (including their subsidiaries) directly or indirectly – i.e. they should not source from or have Tatmadaw-related businesses in their supply chain, given the involvement of the Tatmadaw in natural resource extraction and its responsibility for violations of international human rights law and international humanitarian law in mining areas. Doing so could expose them to criminal and civil liability. (Page 37, Report of the independent international fact-finding mission on Myanmar, 2019)*

“104. In addition, any businesses seeking to or doing business in these areas should conduct heightened due diligence to ensure it is not otherwise causing, contributing to or directly linked to the many international human rights and international humanitarian law violations in the area perpetrated by the Tatmadaw ... In line with the Guiding Principles, any extractive industry business should also conduct heightened due diligence to ensure that they are not exacerbating the conflict (conflict sensitive due diligence) and to ensure that its operations do not result in negative human rights impacts, even in these challenging operating environments.”

The report singles out a single private company – the luxury jeweler Tiffany & Co. – that had demonstrated some level of sensitivity on this matter.

In its conclusion and recommendations to investors and businesses, the report explains in detail the extensive network used by the Tatmadaw to fund its military operations, and on Page 64, Point 183 envisages disengaging the military from the economy: *“Removing the Tatmadaw from Myanmar’s economy will entail two parallel approaches. The first is negative and requires the economic isolation of and disengagement from Tatmadaw associated companies. This includes the above-mentioned economic interests, as outlined in the Mission’s findings. The second approach is positive, and centers on the promotion of economic ties and engagement with non-Tatmadaw companies and businesses in Myanmar as a means of building and strengthening the non-Tatmadaw sector of the economy.”*

It continues on Page 64, Point 184: *“At the same time, pursuing these two approaches in parallel will contribute to fostering the continued liberalization of Myanmar’s economy, including its natural resource sector, albeit in an accountable way, contributing to equity and transparency, as well as greater economic growth for Myanmar’s population.”*

And on Page 66, Point 188i: *“Assist consumers to avoid dealing with MEHL, MEC and their subsidiaries and any other company owned or influenced by the Tatmadaw, including by identifying whether goods exported from Myanmar are produced, sold or exported without any association, directly or indirectly, with the Tatmadaw.”*

And Page 66, Point 189d: *“Any business enterprise purchasing natural resources from Myanmar highlighted in this report, and in particular,*

jade and rubies, and timber from Kachin and Shan States, should conduct heightened due diligence to ensure that the resources were not produced or sold by enterprises owned or influenced by the Tatmadaw (including subsidiaries and joint ventures) or individual members of the Tatmadaw. If so, they should not purchase or use, directly or indirectly, the resources. The OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas provides useful guidance in this regard.”

The report makes a recommendation on Page 67, Point 190 that consumers should: *“Scrutinize goods originating from Myanmar, using the list of companies in the Annexes to this report (and any updated information as it becomes available) to inform consumer choices, and support non-Tatmadaw businesses in Myanmar by purchasing goods from businesses without links to the Tatmadaw.”*

Summarized conclusions of the review of the Human Rights Council Fact-Finding Mission on Myanmar 2019

A. THE MILITARY AND ECONOMY

1. The Burmese military has infiltrated the country's economy through various forms of businesses. It has lost its accountability through its dealings in the private sector.

2. The military has engaged in human rights violations and enriched itself primarily in the jade and ruby businesses. The U.N. Human Rights Council (UN-HRC) report has confirmed human right violations in the amber mines of Tanai. Reports are available for the periods of 2016 and 2017.

3. The military has exploited natural resources for the purpose of raising revenues. The military uses natural resources to finance their human right violations, most notably profiting from the jade and ruby mining sectors.

B. HUMAN RIGHTS ISSUE

1. Although the UN-HRC report does not identify business players that would have directly contributed to human rights violations involving the Rohingya, such violations did in fact occur within the amber-mining area of Burma, specifically around the mining area of Tanai. Any Burmese military activity in the amber-mining region seems to be primarily focused on the fight against the Kachin Independence Army.

C. IDENTIFICATION OF STAKEHOLDERS THAT CONTRIBUTE TO HUMAN RIGHTS VIOLATIONS

1. The UN-HRC report has outlined the business structures of the Burmese military and provided extensive information on those stakeholders seen as contributing to human rights violations. These stakeholders have been subdivided into various categories, which are shown in the report's Appendix. No companies explicitly mentioned as being engaged in amber mining appear in this list.

D. DUE DILIGENCE ADVICE

1. Due diligence protocols related to ethical mining in Myanmar are outlined in the U.N. report, along with an explanation of how to implement them. The report provides guidelines and explains how to handle the dealings and extraction of natural resources in an ethical manner.

E. RECOMMENDATION TO CONSUMERS OF NATURAL RESOURCES

1. The report suggests that the extraction of mineral resources be carried out for the purpose of supporting the local community, rather than doing so in cooperation with the military (the so-called positive approach).

2. The report suggests that enterprises of the military should be isolated and disengaged from mining activities (the so-called negative approach). The details of these business partners of the military are well defined.

PMF: Conclusions

In an editorial (26 May, 2020), the International Palaeontological Society (PE) has contradicted an ethical guideline of SVP using a series of arguments (SVP - Society of Vertebrate Paleontology, 2020). The Peretti Museum Foundation (PMF) has added the results of its own research to substantiate and complete some of the arguments from the PE.

The PE notes that not all Burmese amber comes from a conflict zone. Our report provides the locations of mining sites in conflict as well as in non-conflict areas, confirming the PE statement. PE also states that most of the gemstone money in that part of Myanmar comes from rubies, jade, gold and other materials, and mentions the Myanmar Gem Enterprise (MGE) as the sole sales operator in areas controlled by the government. Evidences have been reported that MGE's figures from official gems auctions only represent a small part of the real sales. For instance, jade annual sales officially total US\$2 billion while according to a 2015 report by international NGO Global Witness (Jade – A Global Witness investigation into Myanmar's "Big State Secret," 2015), the real sales reach more than US\$30 billion per year. This number is not related to amber but to jade. As far as the income from amber sales, after checking MGE auctions from 2015 to 2019, we have found that they represent a negligible figure of the total. This confirms the PE findings.

PE also advocates the creation of a register of authorized dealers ensuring that amber sales benefit the people of Myanmar. The UN-HRC has listed unethical players who should be banned from business. Both lists could be used to fine tune an ethical supply chain.

PE finally mentions the need to develop due diligence measures working together with the Myanmar authorities, industry, museum curators and researchers. In this respect the UN-HRC report provides additional

advises to existing professional protocols (due diligence) that can be recommended.

We have compiled in this report a list of practical and detailed guidelines as well as recommendations made by the UN-HRC. A main UN-HRC recommendation is that business dealings with the MGE auctions be ended. These auctions are the Burmese government's official major venues for gem sales. We found that the value of amber sold at the auctions is 0.07% of the total estimated value of € 90 million in gemstone deals. MGE has no bearing on the amber trade. According to UN-HRC guidelines, the MGE is listed as an enterprise that should be banned due to its possible involvement in the indirect financing of the repressive operations against the Rohingyas. As a practical application of ethical guidelines, MGE sales of amber with invertebrate inclusions have been identified and are listed in our report. Indeed, these samples may not be allowed for publication if one follows the UN-HRC guidelines. PE needs to maintain a careful oversight on these samples appearing in scientific collections.

An examination of the published papers and of the acquisition dates of amber material shows that international journals have not published material that was mined and discovered during and after the times of the culmination of the Rohingya conflict (2017). It is therefore clear that the negative headlines regarding scientific and ethical concerns related to amber extraction in Myanmar cannot be linked to these dramatic events. The conclusions by some sensation-oriented media in this regard must therefore be rejected.

We discovered from our own experiences in the field that most of the amber business is controlled by the Kachin Independence Army (KIA), which exports the majority of production to Chinese markets, confirming this part of

the narrative from the media (Gammon, 2019; Joel, 2020; Lawton, 2019a; Lawton, 2019b; Nitta, 2020; Peretti, 2020; Sokol, 2019).

Other private stakeholders involved in amber mining in the Tannai conflict zone are the indigenous people themselves, who have been living for generations in the area and who have now organized themselves to demand amber-mining rights in the area (Ji, 2019). Many of this community currently live in Internally Displaced People (IDP) camps. It is our interpretation of the UN-HRC recommendations that purchasing amber directly from these indigenous communities should provide much needed financial support to this population.

In a report on these organized indigenous people in the conflict zone, the expression “blood amber” has come as a reference term used by Chinese and other dealers to qualify the highest-quality pieces of amber. Indigenous people have no objection to keep on using this label despite its potential negative connotation, in particular a comparison with “blood diamonds.” We do not see the need for any rebranding (Ji, 2019).

Rather than a ban on the publication of amber mined after 2017, the scientific community should use the attention that it gets from these discoveries to improve the fate of the IDPs living in the amber-mining area, by training them in the search for paleontological samples in an ethical way. Through such a practice, the paleontological community would gain influence in the mining areas and bear a positive influence on the ethical situation. Ostracizing post-2017 amber products would only serve to underline and uphold the status quo of the military position and goes directly against UN-HRC recommendations.

A recent ceasefire between the army and local ethnic armed groups (Wanna, 2020) as well as a national peace process launched in 2011 by a transition government and continued by the elected government since 2015, need to be supported. The achievement of a peace agreement is of utmost importance for the indigenous miners who would have a chance to go back to their mines under safe working

and living conditions. Many IDPs living in camps want to return to their work in the amber mines. As it has done in the past, the PMF will continue to reach out to them through humanitarian activities. It is also important to continue amber acquisitions from indigenous ethical players in the mining regions, as it provides them with necessary support.

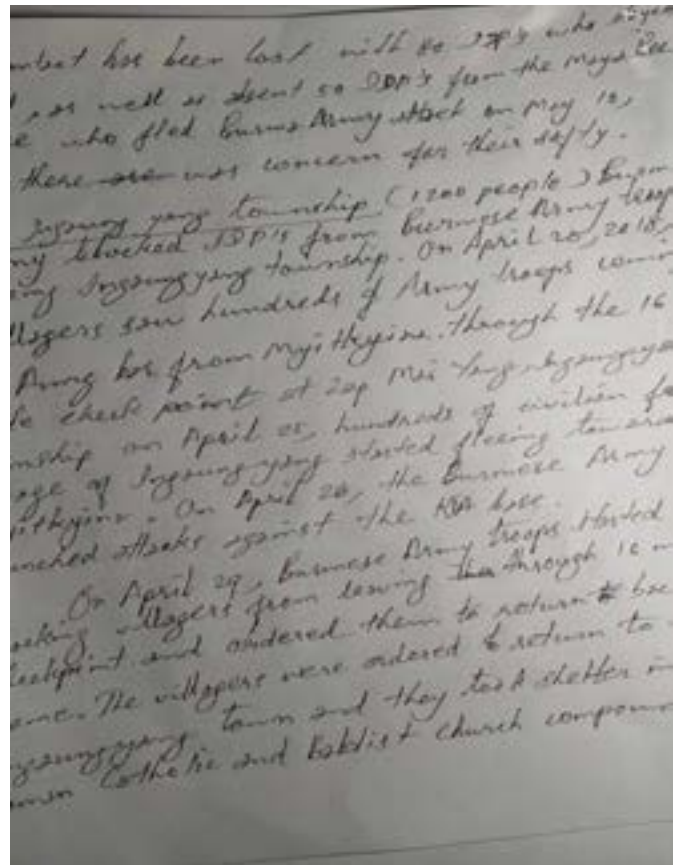
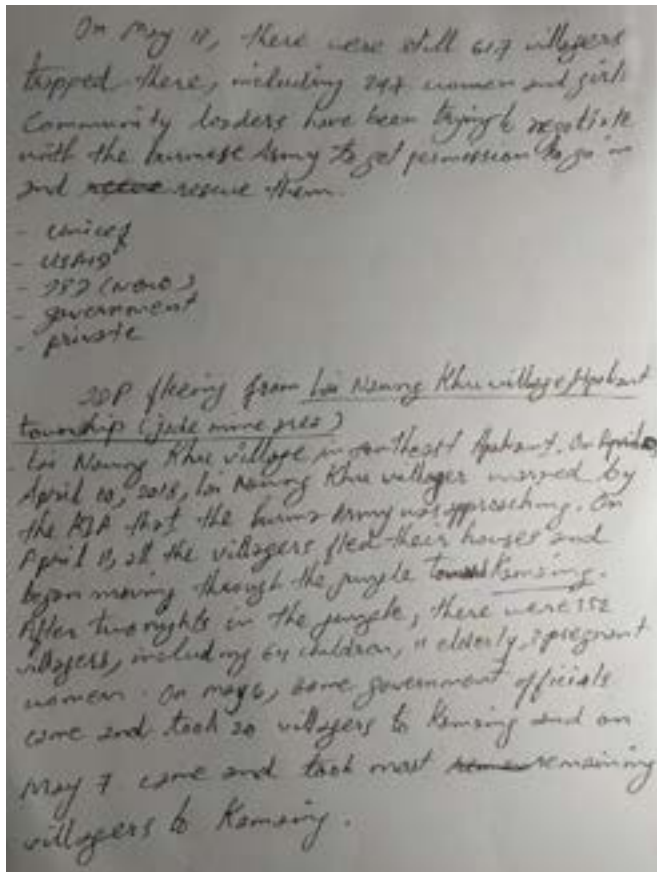
More positive developments can hopefully be expected from the upcoming general elections (8 November, 2020), particularly the opening of new ways to strengthen the civil society and ethnic minorities. In June, the Swiss Government has brokered a code of conduct for fair and peaceful elections, focusing on the protection of representatives from minorities, and a program to prevent promotion of hate speeches on social media. It was signed by 97 parties, including the National League for Democracy (NLD, the party of de facto leader Aung San Suu Kyi).

We suggest that the ban on amber material mined after 2017 as proposed by SVP (SVP - Society of Vertebrate Paleontology, 2020), should be revisited and a harmonized joint declaration should be issued by PE and SVP.

The scientific value of Burmite amber for the understanding of the evolution of life on earth is so spectacular that it creates enormous publicity in the world. The paleontological community could use the world's attention it gets from its research to make sure that the support of indigenous and impoverished population of the amber mines in Burma is never forgotten.

Photographic and E-mail Witness Account: Appendix 1 to 27

APPENDIX 1: GRS AGENTS PROTOCOL OF CONFLICT, WITNESSED IN
APRIL-MAY 2018, HANDWRITTEN ORIGINAL AND TRANSCRIPT (BELOW)
(E-MAIL DATE: 16 MAY 2018)



On May 13, there were still 617 villagers trapped there, including 297 Women and girls. Community leaders have been trying to negotiate with the Burmese Army to get permission to go in and rescue them.

Present for Humanitarian activities were

- UNICEF
- USAID
- JSD (NGO)
- government
- private

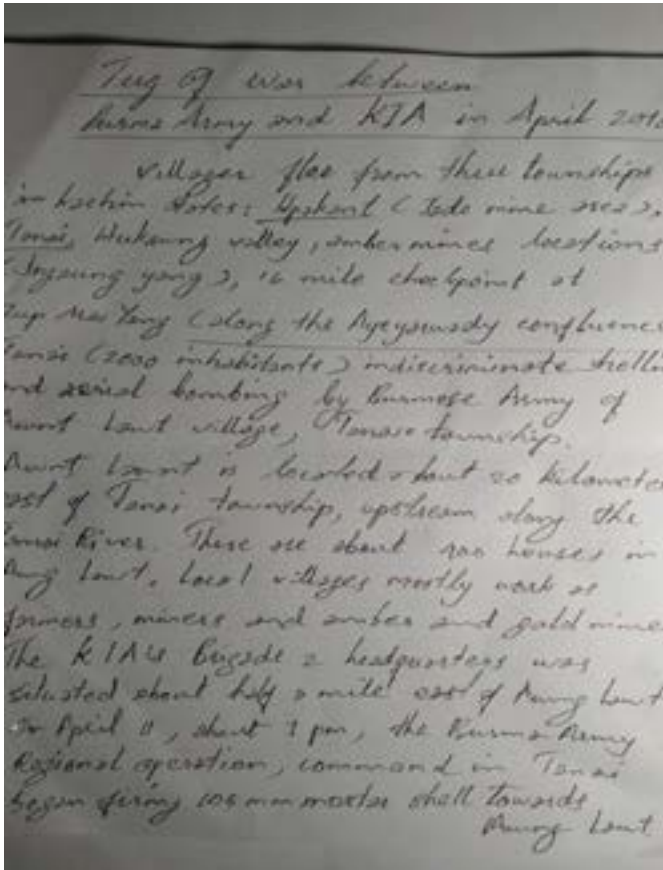
IDP fleeing from Lai Nwng Khu village, Hpakant township (Jade mining area)

Lai Nawng Khu village in southeast Hpakant. On April 10, 2018, Lai Nawng Khu villager warned by the Kia that the Burma Army was approaching. On April 11, all the villagers fled their houses and began moving through the jungle town Kamaing. After two nights in the jungle, there were 152 villagers, including 64 children, 11 elderly, 3 pregnant women. On May 6 some government officials came and took 20 villagers to Kamaing, and on May 7 came and took most remaining villagers to Kamaing.

Contact has been lost with 80 IDP's who strayed behind, as well as absent 50 IDP's from the Maya Bee village who fled Burma Army attack on May 10, and there was concern for their safety.

Ingaung yang township (1200 people) Burma Army blocked IDP's from Burmese Army troops fleeing Ingaung yang township. On April 20, 2018, villagers saw hundreds of Army troops coming to Aung bar from Myitkyina through the 16 mile check point at Zap Mai Yang, Ingaung Young township on April 25, hundreds of civilian from village of Inganugnyanug started fleeing towards Myitkyina. On April 26, the Burmese Army launched attacks against the KIA base. On April 29, Burmese army troops started blocking villagers from leaving through 16 mile checkpoint and ordered them to return back home. The villagers were ordered to return to Ingaung yang town and they took shelter in the Roman Catholic and Baptist church compound there.

APPENDIX 1 CONTINUED

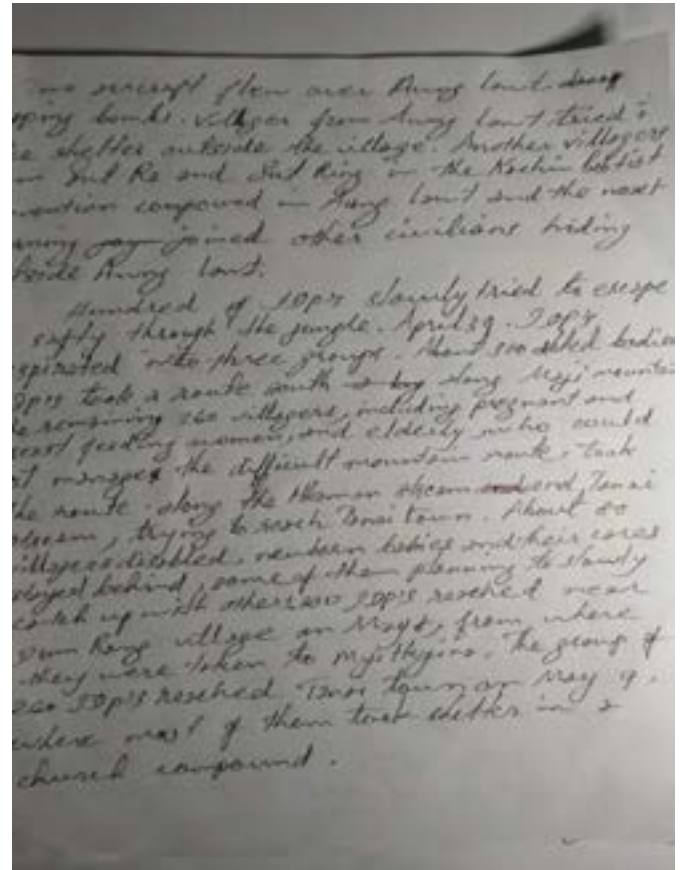


Tug of War between Burma Army and KIA in April 2018

Villager flee from three townships in Kachin states: Hpakan (Jade mine area), Tanai, Hukawng valley, amber mines locations (Ingaung yang), 16 mile checkpoint at Zup Mai Yang (along the Ayeyarwady confluence) Tanai (2000 inhabitants) indiscriminate shelling and aerial bombing by Burmese Army of Awnt Lawt village, Tanai township.

Awnt Lawnt is located about 20 kilometers east of Tanai township, upstream along the Tanai River. There are about 400 houses in Awng Lawt. Local villages mostly work as farmers, miners and amber and gold miners. The KIA's Brigade 2 headquarters was situated about half a mile east of Awng Lawt. On April 11, about 1pm, the Burma Army Regional operation, command in Tanai, began firing 105mm mortar shell towards Awng Lawt.

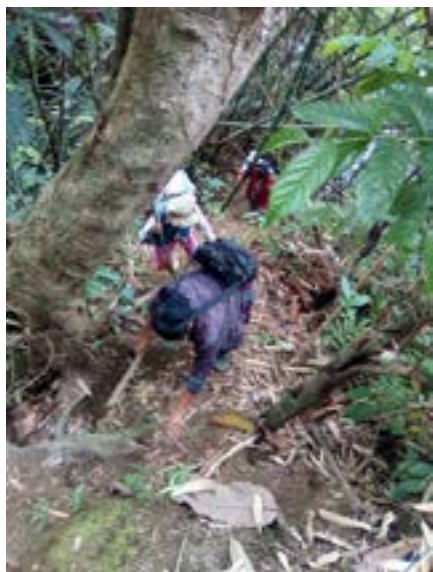
Two aircraft flew over Awng Lawt, dropping bombs. Villager from Awn Lawt tried to take shelter outside the village. Another Villagers from Sut Ra and Sut Ring in the Kachin Baptist convention compound in Awng Lawt and the next morning joined other civilians hiding outside Awnt Lawt.



Hundreds of IDP's slowly tried to escape to safety through the jungle. April 30, IDP's respirationed into three groups. About 300 abled bodied IDP's took a route south along Maji mountains. The remaining 260 villagers, including pregnant and breast feeding women, and elderly, who could not manage the difficult mountain route, took the route along the Hkaman stream and Tanai stream trying to reach Tanai town. About 80 villagers disabled, newborn babies and their cares strayed behind, some of them planning to slowly catch up with others. 300 IDP's reached near Dum Bang village on May 8, from where they were taken to Myitkyina. The group of 260 IDP's reached Tanai town on May 9, where most of them took shelter in a church compound.

Ingaung yang township (1200 people) Burma Army blocked IDP's from Burmese Army troops fleeing Ingaungyang township. On April 20, 2018, villagers saw hundreds of Army troops coming to Aung bar from Myitkyina through the 16 mile check point at Zap Mai Yang, Ingaung yang township on April 25, hundreds of civilian form village of Ingaung yang started fleeing towards Myitkyina. On April 26, the Burmese Army launched attacks against the KIA base. On April 29, Burmese army troops started blasting villages

**APPENDIX 2: TANAI IDP FLEEING FROM THE FIGHTING BETWEEN THE
BURMESE MILITARY AND THE KIA (E-MAIL DATE: 11 MAY 2018)**



E-mail (original content,
uncorrected):

Hi Adi , Tanai IDPs is still in trapped
till now and gov . military hasn't
allow to take the civilian from Tanai
location at the moment.

Civilians from Tanai township amber mines sheltering in an improvised refugee camp after fleeing a conflict between the Myanmar Army and the Kachin Independence Army. 2018, GRS.

**APPENDIX 3: IDP FLEEING FROM EVENTS EVOLVING AROUND
JANG YANG (E-MAIL DATE: 6 MAY 2018)**



APPENDIX 4: IDP FLEEING FROM EVENTS OF BURMESE MILITARY WITH KIA (SOURCE FROM KACHIN TIMES) (E-MAIL DATE: 28 APRIL 2018)



Civilians from Tanai township amber mines area flee a conflict between the Myanmar Army and the Kachin Independence Army. 2018, GRS.

**APPENDIX 5: IDP PROVISIONAL CAMP SUPPORTED BY GRS
HUMANITARIAN ACTIVITIES (E-MAIL DATE: 30 APRIL 2018)**



E-mail (original content, uncorrected):

Hi Adi , I would like to inform you that I have connected with IDPs team this morning .

IDPs from Awng Lawt and Lai Nawng Hku Areas are still trapped in the jungle.

They are around 2500 Persons Newly arrived IDPs from northern part of Kachin state are now around 1500 people staying around Myitkyina

Urgently they would need Medical Aids, Food and shelter.

I will wire 1 million Kyat to camp manager today.

I will go Myitkyina next week .



APPENDIX 6: IDP CAMP AT MYIT SONE (E-MAIL DATE: 5 MAY 2018)



A bamboo shelter built for civilians from Tanai township who have fled a conflict between the Myanmar Army and the Kachin Independence Army. 2018, GRS.



Civilians from Tanai township amber mines sheltering in an improvised refugee camp after fleeing a conflict between the Myanmar Army and the Kachin Independence Army. 2018, GRS.

APPENDIX 7: GRS HUMANITARIAN ACTIVITIES TO BAPTIST TRINITY CHURCH FOR THE SUPPORT OF IDP (E-MAIL DATE: 16 MAY 2018)

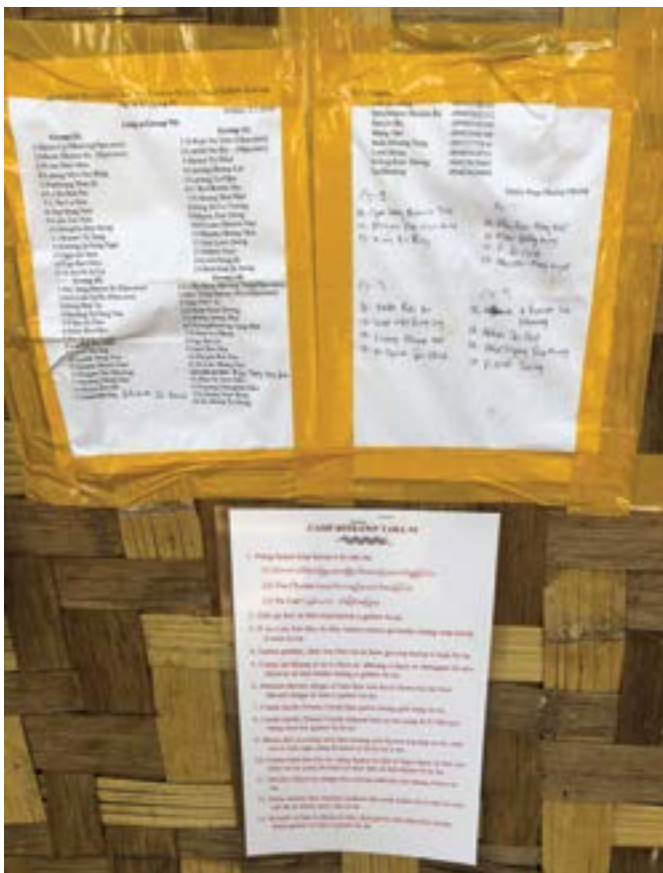


E-mail (original content, uncorrected):

Hi Adi , Baptist Trinity Church pastor spend this essentials stuff from your charity and medicine as well.

APPENDIX 8: LIST OF INTERNALLY DISPLACED PEOPLE (IDP) WITH DETAILS OF HOUSEHOLDS FROM THE AMBER MINES IN APRIL 2018

No	H.Hs	Village name	Male	Female	Total	Remark
1	10	Sari Tu Yang	19	14	33	
2	23	Bum Nen Yang	64	53	117	
3	8	Gwi Htau	15	16	31	
4	3	Bung Ze Zup	11	12	23	
5	3	Hkum Tsai Taw Yang	5	10	15	
6	2	Gum San Yang	1	2	3	
7	7	Baio Zup	14	18	32	
8	26	N-grong Kawng	48	73	121	
9	12	Sut Ngai Yang	24	35	59	
10	22	Tang Bau Yang	38	54	92	
11	49	Pung Sei Yang	99	125	224	
12	42	Zup Mai Yang	102	147	249	
13	1	Ja Htu Yang	-	2	2	
14	6	Man Ia	18	19	37	
15	6	Lawat Mai Yang, Maaw Yang	11	16	27	
Total	220		468	596	1064	



**APPENDIX 9: GRS HUMANITARIAN ACTIVITY; PRAYING CEREMONY FOR
IDP AT TANAI TOWNSHIP CHURCHES (E-MAIL DATE: 26 JUNE 2018)**



**APPENDIX 10: TEMPORARY IDP CAMP AT BAPTIST CHURCH AND YOUTH EDUCATION CENTER
(E-MAIL DATE: 26 JUNE 2018)**



E-mail (original content, uncorrected):

Hi Adi , Greeting from Myitgyina,

I visited 2 IDPs at Baptist Church and Kachin Youth Education centre outside of city (No Save zone)

New 500 people flee from Awng Lork village , Tanai area and stay at Jaw Masat Baptist Church temporarily at the moment .

Total flee people are over 3000 now 4 different IDPs .

Vacines and Education sector control by gov .directly at single IDPs.

So I passed 2 K to Pastor from Trinity Church . He will provide nutrition fact for children instead of Vacines .

APPENDIX 11: TRINITY IDP CAMP IN MYITGYINA (E-MAIL DATE: 31 OCTOBER 2018)



E-mail (original content, uncorrected):

Hi Adi , Hope you are still super busy .
I just inform you that IDPs from Myitgyina which we'd donated conflict over 1000 people set new place outside of city . it is resettlr by Myitgyina gov.



**APPENDIX 12: GRS SPONSORED HUMANITARIAN ACTIVITIES
FOR REFUGEES FLEEING THE CONFLICT MINES**



TOP A Kachin leader distributes food to a refugee during a GRS humanitarian campaign. 2018, GRS.

APPENDIX 13: GRS SPONSORED HUMANITARIAN ACTIVITIES THROUGH A LOCAL BAPTIST CHURCH



A Christian church in a Kachin village is used for shelter by civilians from Tanai township amber mines who fled a conflict between the Myanmar Army and the Kachin Independence Army. 2018, GRS.

APPENDIX 14A: DETAILS OF HUMANITARIAN PROJECTS CO-SPONSORED BY GRS IN THE AMBER MINES (E-MAIL DATE: 4 MAY 2018)



APPENDIX 14B: DETAILS OF HUMANITARIAN PROJECTS CO-SPONSORED BY GRS IN THE AMBER MINES (E-MAIL DATE: 4 MAY 2018)



E-mail (original content, uncorrected):

Hi Adi , I donated 11 K balance local currency to Trinity Church pastor and another camp at Myit Sone .1075 adult and kids 260 and 800 people at Trinity Bitish Church . 4000 still trapped in jungle.

see some photo attached!

more photo and info; with me when I come next week there.



APPENDIX 15: PUBLIC PETITION SIGNING IN TANNAI FOR THE RELEASE OF IDP FROM CAMP SITES



Civilians from Tanai township amber mines who have fled a conflict between the Myanmar Army and the Kachin Independence Army sign a board requesting assistance for internally displaced people. 2018, GRS.

APPENDIX 16: IDP AT TRINITY BRITISH CHURCH (E-MAIL DATE: 5 MAY 2018)



**APPENDIX 17A: MINERS OF TEMPORARY MINING CAMPS IN MAI KHUN
(NEAR TANAI) RETURNING TO THEIR MINES IN DEC 2017**



**APPENDIX 17B: MINERS OF TEMPORARY MINING CAMPS IN MAI KHUN
(NEAR TANAI) RETURNING TO THEIR MINES IN DEC 2017**



**APPENDIX 18: OPEN-PIT MINING OF RED AMBER AT MAI KHUN (NEAR TANAI)
(E-MAIL DATE: 4 AUGUST 2017)**



APPENDIX 19: UNDERGROUND MINING AT AUNG BAR AND ZEE PHYU KONE (E-MAIL DATE: 4 JULY 2017)



APPENDIX 20: OPEN-PIT MINING OF RED AMBER AT MAI KHUN (NEAR TANAI)



APPENDIX 21: WASHING AT MAI KHUN (NEAR TANAI) WHERE A RED VARIETY OF AMBER IS PRODUCED. DECEMBER 2017.



APPENDIX 22: OPEN STREET MARKET FOR ROUGH AMBER IN TANAI



APPENDIX 23: OPEN STREET MARKET FOR ROUGH AND CUT AMBER JEWELLERY IN TANAI



APPENDIX 24: CUTTING OPERATION IN IDP CAMPS AT KHET CHO VILLAGE



APPENDIX 25: CUTTING OPERATION AND AMBER SORTING IN FAMILY UNITS AT IDP CAMPS AT KHET CHO VILLAGE



APPENDIX 26: SPECIALIZED AGENTS AT A CAFE IN WAI MAW TOWN INVESTIGATING AMBER FOR PALEONTOLOGICALLY INTERESTING FINDINGS (VERTEBRATE AND INVERTEBRATE INCLUSIONS)



Literature

- ACTA Palaeontologica Polonica. (2020). *Burmese Amber and Human Rights*. [online] Available at: <https://app.pan.pl/news.html> [Accessed 21 Jul. 2020].
- Barrett, P.M. and Johanson, Z. (2020). Myanmar (Burmese) Amber Statement. *Journal of Systematic Palaeontology*, [online] 18(13). Available at: <https://www.tandfonline.com/doi/full/10.1080/14772019.2020.1764313?scroll=top&needAccess=true> [Accessed 21 Jul. 2020].
- Gammon, K. (2019). *The Amber-Fossil Supply Chain Has a Dark Human Cost*. [online] Available at: <https://www.theatlantic.com/science/archive/2019/08/amber-fossil-supply-chain-has-dark-human-cost/594601/> [Accessed 21 Jul. 2020].
- Geological map of the Sagaing and Kachin area. (2019). Ministry of Natural Resources and Environmental Conservation (Myanmar). Coordinate system: gcs mmd2000, map no.83/N,83/k,83/o,83/l,83/p,92/a,92/c,92/d.
- Haug, J.T., Azar, D., Ross, A. et al. (2020). *Comment on the letter of the Society of Vertebrate Paleontology (SVP) dated April 21, 2020 regarding "Fossils from conflict zones and reproducibility of fossil-based scientific data": Myanmar amber*. [online] PalZ. Available at: <https://doi.org/10.1007/s12542-020-00524-9> [Accessed 2 Aug. 2020].
- Hunt, K. (2017). *Rohingya crisis: How we got here*. [online] CNN. Available at: <https://edition.cnn.com/2017/11/12/asia/rohingya-crisis-timeline/index.html> [Accessed 21 Sep. 2019].
- Jade - A Global Witness investigation into Myanmar's "Big State Secret." (2015). [online] <https://www.globalwitness.org>. Global Witness. Available at: <https://www.globalwitness.org/jade-story/> [Accessed 21 Jul. 2020].
- Ji, T. (2019). *Blood Amber - Military resource grab clears out indigenous peoples in Kachin State's Hugawng Valley*. [online] www.kdng.org. Kachin Development Networking Group. Available at: https://kdng.org/wp-content/uploads/2019/08/BloodAmber_English.pdf [Accessed 21 Jul. 2020].
- Joel, L. (2020). Some Paleontologists Seek Halt to Myanmar Amber Fossil Research. *The New York Times*. [online] 11 Mar. Available at: <https://www.nytimes.com/2020/03/11/science/amber-myanmar-paleontologists.html> [Accessed 21 Jul. 2020].

- Lawton, G. (2019a). Blood amber: *The exquisite trove of fossils fuelling war in Myanmar*. [online] New Scientist. Available at: <https://www.newscientist.com/article/mg24232280-600-blood-amber-the-exquisite-trove-of-fossils-fuelling-war-in-myanmar/> [Accessed 21 Jul. 2020].
- Lawton, G. (2019b). *Military now controls Myanmar's scientifically important amber mines*. [online] New Scientist. Available at: <https://www.newscientist.com/article/2214875-military-now-controls-myanmars-scientifically-important-amber-mines/> [Accessed 21 Jul. 2020].
- Lwin, N. (2020). *Efforts to Fix Myanmar's Deadly Jade Mine Issue Face Obstacles*. [online] The Irrawaddy. Available at: <https://www.irrawaddy.com/news/burma/efforts-fix-myanmars-deadly-jade-mine-issue-face-obstacles.html> [Accessed 21 Jul. 2020].
- MEITI Report For The Period April 2015 - March 2016, Oil, Gas And Mining Sectors. (2018). [online] www.eiti.org. Myanmar Extractive Industries Transparency Initiative (MEITI). Available at: https://eiti.org/files/documents/meiti_report_2015-2016_final.pdf [Accessed 21 Jul. 2020].
- Nitta, Y. (2020). *Myanmar amber traps scientists in ethical dilemma over funding war*. [online] Available at: <https://asia.nikkei.com/Location/Southeast-Asia/Myanmar-amber-traps-scientists-in-ethical-dilemma-over-funding-war> [Accessed 21 Jul. 2020].
- Nyein, S.W., Zaw, K., Htet, Z.M. and Lynn, N.H. (2018). *Journey of the blood jade*. Available at: <https://www.mmtimes.com/news/journey-blood-jade.html> [Accessed 21 Jul. 2020]. Images shown at the photo exhibition at The Yangon Gallery, Myanmar between 16th to 18th May 2018.
- Nyunt, T.T., Sun, T.T., Cho, C., Kyaw, N.B.B. and Aung, W.Y.L. (2019). Amber from Khamti, Sagaing Region, Myanmar. In: *The 36th International Gemmological Conference, Nantes, France*. The 36th International Gemmological Conference. .
- Peretti, A. (2020). *Statement on the Ethical Situation in Burma (Myanmar) - A reply to a New York Times Article containing citations from Adolf Peretti*. [online] PMF.org | Peretti Museum Foundation. Available at: <https://www.pmf.org/press-1> [Accessed 21 Jul. 2020].
- Report of the independent international fact-finding mission on Myanmar. (2019). [online] www.un.org. United Nations. Available at: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G19/236/74/PDF/G1923674.pdf?OpenElement> [Accessed 21 Jul. 2020]. Human Rights Council Forty-second session.
- Ross, A.J. (2019). Burmese (Myanmar) amber checklist and bibliography 2018. *Palaeoentomology*, 2(1), p.22.
- Shi, G., Grimaldi, D.A., Harlow, G.E., Wang, J., Yang, M., Lei, W., Li, Q. and Li, X. (2011). Age constraint on Burmese amber based on U–Pb dating of zircons. *Cretaceous Research*, [online] 37(155–163). Available at: <https://www.sciencedirect.com/science/article/pii/S0195667112000535> [Accessed 21 Jul. 2020].

- Sokol, J. (2019). *Fossils in Burmese amber offer an exquisite view of dinosaur times-and an ethical minefield*. [online] Science | AAAS. Available at: <https://www.sciencemag.org/news/2019/05/fossils-burmese-amber-offer-exquisite-view-dinosaur-times-and-ethical-minefield> [Accessed 21 Jul. 2020].
- Spektorov, Y., Linde, O., Cornelissen, B. and Khomenko, R. (2013). *The Global Diamond Report 2013: Journey through the Value Chain*. [online] www.bain.com. Bain & Company. Available at: https://www.bain.com/contentassets/f7ee94e14a9c4f16a174b46f49a5b655/bain_report_the_global_diamond_report_2013.pdf [Accessed 21 Jul. 2020].
- Sun, T.T., Kleismantas, A., Nyunt, T.T., Minrui, Z., Krishnaswamy, M. and Ying, L.H. (2015). Burmese Amber from Hti Lin. *Journal of Gemmology*, 34(7), pp.6–15.
- SVP - Society of Vertebrate Paleontology. (2020). *Fossils from conflict zones and reproducibility of fossil-based scientific data*. [online] Available at: <http://vertpaleo.org/GlobalPDFS/SVP-Letter-to-Editors-FINAL.aspx> [Accessed 21 Jul. 2020].
- Wanna, S. (2020). *Kachin armed group to cooperate with Tatmadaw in virus fight*. [online] Available at: <https://www.mmtimes.com/news/kachin-armed-group-cooperate-tatmadaw-virus-fight.html> [Accessed 21 Jul. 2020].

MGE Auction Catalogues

- Catalogue of Myanmar Gems. Fifty-Second Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee. 24 June - 6 July 2015.
- Catalogue of Myanmar Jade. Tender Volume II. 52nd Myanmar Gems Emporium. The Government of The Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gem Emporium Committee. 24 June – 6 July 2015.
- Myanmar Gem Emporium Central Committee. Ministry of Mines. Republic of the Union of Myanmar. The Emporium Sale of Raw Gems and Jade in Myanmar Currency Kyat. The Catalogue of Raw Gem Lots. December 2015.
- Catalogue of Myanmar Gems. Fifty-Third Myanmar Jade, Gems & Pearl Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee. 24 - 28 June 2016.

- Catalogue of Myanmar Gems. Mid-Year 2016, Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Mines, Myanmar Gems Emporium Committee. 20 - 29 November 2016.
- Myanmar Gem Emporium Central Committee. Ministry of Natural Resources and Environmental Conservation. Republic of the Union of Myanmar. The Emporium Sale of Raw Gems and Jade in Myanmar Currency Kyat. The Catalogue of Raw Gem Lots. March 2017.
- Catalogue of Myanmar Gems. Fifty-Fourth Myanmar Jade & Gems Emporium, Gems Working Committee. The Government of the Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gems Emporium Committee. 2 - 11 August 2017.
- Catalogue of Myanmar Gems. Mid-Year 2017, Myanmar Jade & Gems Emporium, Gems Working Committee. The Government of the Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gems Emporium Committee. 12 - 21 December 2017.
- Catalogue of Myanmar Jade. Mid Year Emporium. The Government of The Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gem Emporium Committee. December 2017.
- Catalogue of Myanmar Gems. Fifty-Fifth Myanmar Jade & Gems Emporium, Gems Working Committee. The Government of the Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gems Emporium Committee. 20 - 29 June 2018.
- Myanmar Gem Emporium Central Committee. Ministry of Natural Resources and Environmental Conservation. Republic of the Union of Myanmar. The Emporium Sale of Raw Gems and Jade in Myanmar Currency Kyat. The Catalogue of Raw Gem Lots. 12 -14 November 2018.
- Catalogue of Myanmar Gems. Fifty-Sixth Myanmar Jade & Gems Emporium. The Government of the Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gems Emporium Committee. 11 - 20 March 2019.
- Myanmar Gem Emporium Central Committee. Ministry of Natural Resources and Environmental Conservation. Republic of the Union of Myanmar. The Emporium Sale of Raw Gems and Jade in Myanmar Currency Kyat. The Catalogue of Raw Gem Lots. 8 - 9 June 2019.
- Catalogue of Myanmar Gems. Mid – 2019, Myanmar Jade & Gems Emporium, Gems Working Committee. The Government of the Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation, Myanmar Gem Emporium Central Committee. 16 - 25 September 2019.

Acknowledgments

As a Patron Member of SVP, I would like to thank its President, Prof. Emily Rayfield for making us aware of the United Nations Human Right Council Fact Finding Report of Myanmar. This report is a game-changer for advice on how to handle the natural resources from Burma. Prof. Rayfield also suggested to us to send our report to the UNHRC-FFRM on the occasion of their calling for public contributions.

We thank all international participants of the Peretti Museum Symposium on Amber Research in December 2019. These participants have contributed fruitful discussions how to inaugurate the Peretti Museum Foundation as a private museum with the aim of harboring samples for public access and scientific research under Swiss Government oversight.

This report would not have been possible without our contacts in Myanmar and the cooperation of Burmese miners in the Amber mining areas, IDP cutters and agents. Humanitarian activities would not have been possible without the cooperation of the Baptist church in the area, and for this support we are extremely grateful.

Dr. Joseph Bevitt suggested the new name of our museums' journal. It is a new approach to concentrate on publishing only on scientific research results when they are obtained through support of the indigenous people and impoverished population of the mining areas. The Swiss government accepted our foundation by-laws and put the PMF under direct Swiss federal oversight. We are grateful that we can operate under Swiss law and also officially engage in humanitarian activities within the framework of PMF.

GRS staff from Thailand, Switzerland and Hong Kong contributed to the successful completion of this report and the website (PMF.org) as a publishing media platform.

Pledge to ethical engagement

The Peretti Museum Foundation will do everything in its power to ease the hardships of people working in gemstone mines and doing fieldwork in Myanmar and elsewhere to the best of its ability. This will occur either directly, through private contributions, or indirectly with the aid of local organizations and churches, or via international organizations that focus their efforts on helping children, the elderly and disabled in mining communities within the law and framework of the host country. The Museum makes the utmost effort to ethically source research material while promoting the protection of nature, the safety for workers, and the use of non-child labour.



Peretti
Museum
Foundation

PMF.org