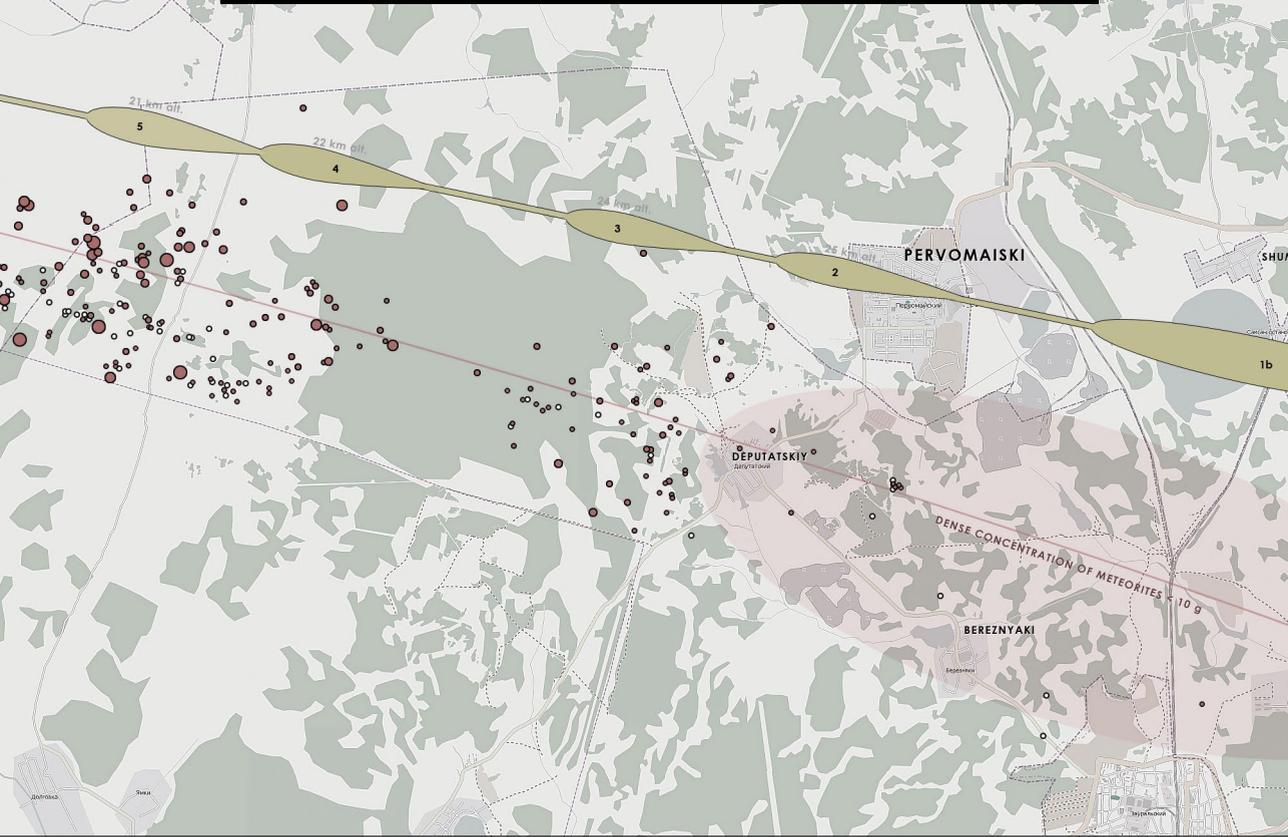


Челябинский метеор

ACQUISITION AND REMOVAL OF THREE
WINDOWS - SHATTERED BY THE BLAST
WAVE OF THE CHELYABINSK METEOR OF
FEBRUARY 15 2013



SVEND BUHL / DAVE GHEESLING

ZAURALSKIY

ON FEBRUARY 15 2013,

Shortly after 09:20 YEKT (Yekaterinburg Time), a bright, exploding meteor occurred over the Chelyabinsk oblast. The airburst of the fireball produced a shockwave that hit the city center of Chelyabinsk 1 minute and 24 seconds after the first bright flash. The thundering airblast caused widespread damage in the city and the settlements adjacent to the meteor's trajectory. More than 1,200 people were injured by broken glass from windows that were blown in when the shock wave hit. Roofs collapsed, door frames were shattered and car alarms were triggered in the entire area.

The fireball - technically a superbolide - was caused by a relatively small asteroid, approximately 17 meters in size, entering the Earth's atmosphere at a speed of approximately 30 km/s at an atypically shallow angle. While the meteor was slowed down by the atmosphere to a speed of about 19 km/s, ram pressure increased and the asteroid began to fragment at an altitude of ~37 km due to the stress overload. The resulting explosion released an energy equivalent of 90 kilotons of TNT and was recorded at seismic stations around the globe. First calculations by NASA/JPL corrected lower estimates by the Russian Academy of Sciences (~ 10 tonnes) and gave an initial mass of 11,000 tonnes for the preatmospheric mass, making it the largest object to have collided with Earth's atmosphere since the 1908 Tunguska event (which also occurred over Russia). The meteorite fall of Chelyabinsk is the largest in the 21st century and has been named *the most important natural event of the current millennium*. It has changed our understanding of meteorite impacts and led to a complete change of how we assess the threats of interplanetary debris to Earth.

„SVEND, WHAT DO YOU THINK ABOUT THIS...?“

by Dave Gheesling

It started just like that, as so many things do. If I had known then how difficult and tedious the undertaking was going to be, the words never would have been uttered.

Since the epic Chelyabinsk superbolide of 15 February, 2013, Svend and I had been working on the procurement of meteorites recovered on the ground. Specimens collected within the first two or three days of the event were the first to arrive, and opening a package containing a 277-gram individual was one of the most exciting moments I recall as a private collector. It was just an ordinary chondrite – something I’d opened countless times before – but this one somehow looked and felt very different. It was a piece of the largest meteoric event in more than a century.

Svend and I very much enjoyed the process of this search, which would continue until the hunt was over and we’d acquired final collection pieces. For different reasons, neither of us were able to join the strewn field hunt, a fact which we both accepted, but not without notable disappointment. I was fully expecting individuals weighing tens of kilos to be recovered during the massive ground hunt and had hoped to acquire one of same, but settling on a 1.85-kilogram complete individual, which Svend indirectly secured from

the field, was certainly no disappointment. And Svend’s 772-gram collection piece, which I housed for a moment in time, may be my favorite stone from the fall. But the big story in the global community’s mind wasn’t necessarily the stones. It was the magnitude of the event, which continued to be best conveyed and understood in human terms by the ground damage and human injury resultant of the incredibly powerful shock wave – particularly as both were directly connected to blasted window glass. It hit me: a complete window – not just a piece of glass that was by word-of-mouth associated with the event – should be preserved for history.

At the first mention of this notion to Svend, he obviously found the idea silly at best. Overt enthusiasm was applied, however, and his search for the silly was underway. When he told me about the initial response he’d heard – that it would be “impossible” to recover and receive shipment of such a window – only the words of Werner von Braun echoed in my mind: “I’ve learned to use the word ‘impossible’ with the greatest caution.”

But as Svend always does, he pressed ahead. As early reports returned from the field, my initial vision of securing a commercial window from Chelyabinsk Oblast, photographed in situ, quickly evapo-



The Chelyabinsk meteor trail photographed from the cockpit of an Airbus A 320 at 09:22 a.m. on the morning of February 15 during flight SU1639 from Omsk to Moscow. Captain Sergey Valeryanovich described his shot as “probably the best photo of my life”. Photo: Sergey Valeryanovich

rated in light of the apparently rapid progress of damage repairs. I began to lose interest in the concept almost immediately, but Svend had already set the wheels in motion.

When we received a substantial line-item expense reimbursement request for supplies, we were both

fairly shocked. We’d now spent money we never even agreed to spend, people were actively pursuing the Holy Grail of Windows, and the point of no return had clearly been reached. At best, we both assumed it would probably be nothing more than a write-off.

When the first images of old,



CHELYABINSK

Stone, chondrite, L5, S4, W0
 Chelyabinsk oblast,, Russia
 Fall: February 15, 2013
 09:20 YEKT
 TKW: > 720 kg
 Individual: 772.0 g

Meteorite Recon # B-442.31

Image and specimen card of the 772 g Chelyabinsk individual acquired by D. Gheesling, which is now part of the Buhl Meteorite Collection. The position and course of shock planes can clearly be seen under the thin layer of secondary fusion crust. Rough edges and coarse texture of this surface point to a late-stage fragmentation shortly prior to the transition into dark flight. Photo: S. Buhl

blue, taped-together wooden windows hit my screen, I liked the idea even less. These windows looked nothing like what was initially imagined. But to the contrary, Svend was now more excited about the project than he'd ever been (and at that point I still had no idea he'd been losing sleep over a futile search for the silly). Instead of a faceless mass product - which could have originated from any random industrial estate in the world - we had located windows that like no other represented the true Soviet era environment of the Chelyabinsk oblast. These windows, hand-crafted in the very year Josef Stalin became head of the Central Committee of the Communist Party of the Soviet Union, were now over 80 years old. As constituent of a settlement built for coal miners in 1930, they were already a part of Soviet history before the sonic blast wave left its mark on them.

Svend already knew what I didn't yet. The documentation, generated under his direction, was incredible, and the location was far better than we had imagined - probably better than we were able to have imagined. We had located shattered windows - not from the distant city, but from the strewn field itself.

In many ways, the story had only then begun. But as is typically the case between us, the project became an unforgettable experience that we both grew to appreciate, probably beyond words. And it is our hope that future generations come to appreciate this spectacular artifact of cosmic history even more over time...



The impressive debris trail of the Chelyabinsk superbolide photographed from the north, shortly after 9:20 hrs Yekaterinburg time. The trail extends over a length of more than 80 kilometers. The large convection tower marking a tapering of the trail the in the right segment of the cloud expands upwards from an altitude of 32 kilometers. At the time the photo was taken, northerly winds in altitudes up to 30 km and stronger west/northwesterlies at higher levels (80–100 m/s) already contributed to a light curvature of the debris cloud to the southwest (left section of photo). Photo: M. Ahmetvaleev

SECURING A BLAST WAVE ARTIFACT



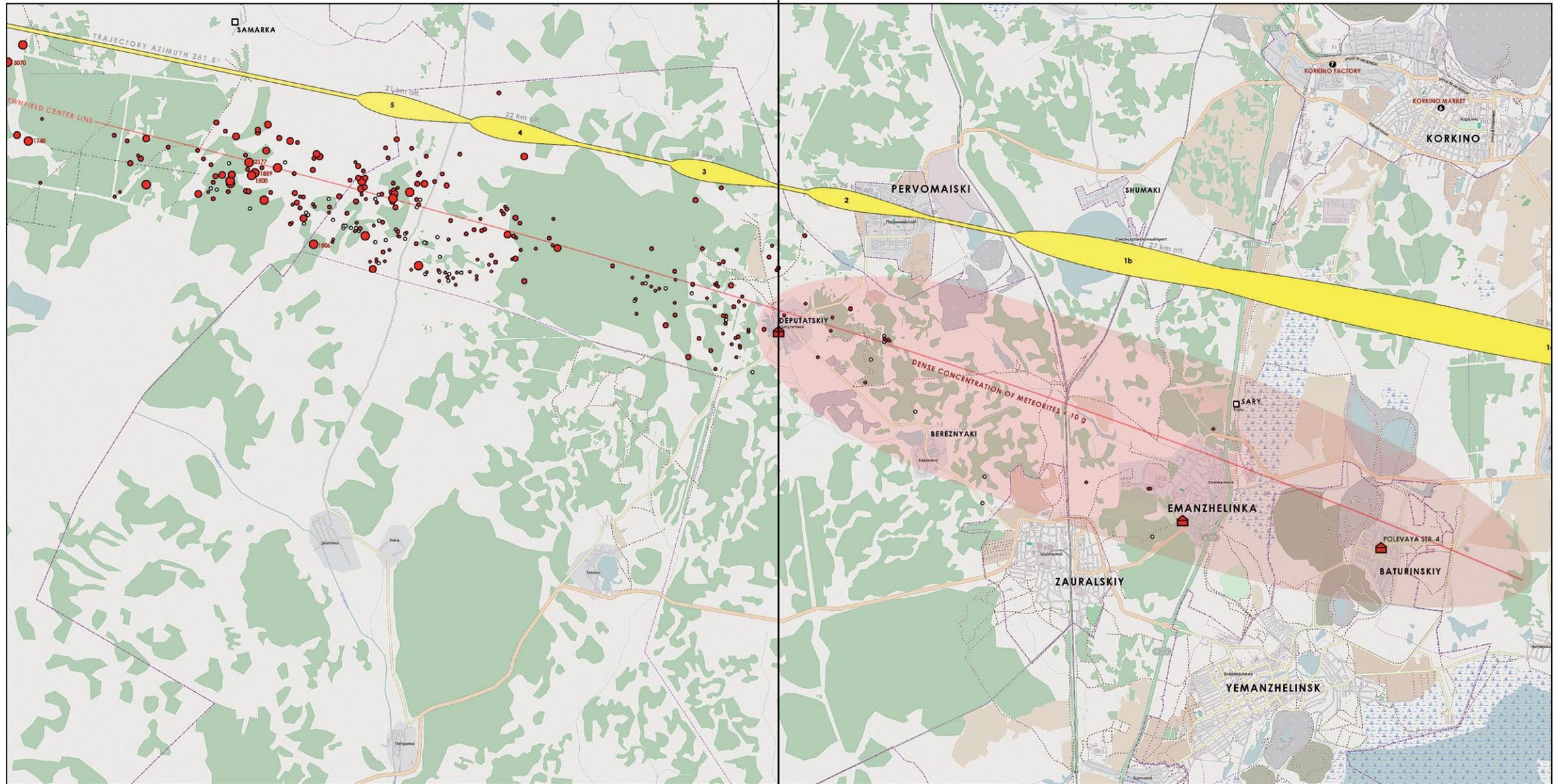
Village sign of Emanzhelinka, a mining settlement in the Yemanzhelinsky District of Chelyabinsk Oblast, Russia, located on the eastern slopes of the Southern Ural Mountains 50 kilometers south of Chelyabinsk. The meteor of Feb. 15 passed 800 meters north of the village at 27 km altitude. Due to its close proximity to the first and most violent detonation, the settlement was hit by the sonic airblast with much greater force than the City of Chelyabinsk itself. Photo: C. V. Pisklov

As has happened on similar occasions in the past, meteorites and memorabilia of the event quickly found a market. Within days after the fall, pieces of broken glass from Chelyabinsk were offered on local sales platforms via the internet. Few if any of these samples were accompanied by documentation deserving the name. Like in past meteorite falls, these artifacts were treated as mere curiosities and changed hands without any recording of their original context — destined to reenter insignificance once the oral history linked to them is lost.

Given the historical significance of the Chelyabinsk event, and in light of the preceding damage repair and reinstatement work, a plan was made to salvage meaningful artifacts bearing witness to the destruction caused by the meteor's shockwave. The objective was to document and to preserve these artifacts for future generations. For this purpose, one month after the event, in mid March, an operation was commenced in the course of which three windows shattered by the blast wave were located and recovered from the damage area.

These three broken windows, removed from a wooden dwelling in the hamlet of Baturinsky Razrez in Yemanzhelinsk, remain to date the only larger objects altered by the sonic blast wave that were removed for preservation from the damage zone.

This is their story ...



Detail of the strewnfield and trajectory projection of the Chelyabinsk superbolide. The excerpt shows the eastern section of the trajectory (yellow) with the main fragmentations, which roughly correspond to the level of maximum energy deposition and approximate origination of the sonic blast waves. The red line indicates the centre of the meteorite strewnfield. It cuts straight through the mining settlement of Baturinskiy Razrez in the Yemanzhelinsk municipal. Map: S. Buhl and Karl Wimmer



In situ photograph of a 2,177 g Chelyabinsk meteorite found after the snow melt, on April 23 (scale cube is 1 cm). The recovery of meteorites was clearly the prior objective behind the early scientific research, while damage assessment and repairs were left to authorities and insurance companies. Photo: P. Muromov

“IMPOSSIBLE!”

In March 2013, one month after the Chelyabinsk meteorite fall, I was working on several projects related in various aspects to the event. The compilation of a trajectory projection and strewnfield map that would help researchers recover meteorites in the field was on top of the priority list. Together with Karl Wimmer, who at this time had already completed an initial triangulation of the meteorite’s path, I was in contact with several teams in the field who provided us with data and meteorite specimens. Work was proceeding swiftly and the new discoveries and associated data that arrived hourly in our mailboxes kept our adrenaline high.

It was around this time, when my correspondence with Dave Gheesling led to a most simple question: “With all this broken glass coming from Chelyabinsk” Dave suggested, “shouldn’t we preserve a blasted window in its complete state?” Having travelled to Russia before, and being aware of how the simplest tasks become very complicated very quickly, I was rather reluctant. But my friend insisted, and the more I thought about his idea, the more I had to admit that there was something to it.

Fact was: The historic megabolide had devastated an entire city. The blasted windows had already become iconic and the city council had even discussed the construction of a monument in the shape of a sixty foot-high broken window. Given the current speed of repairs, however, nothing tangible would remain of the damage in a matter of weeks. Meteorite history would mention collapsed roofs and blasted windows, but until then, all physical evidence of the event would have been erased. I promised to approach my Russian contact

with the matter and explained our desires to Pjotr Muromov – the one and only citizen of this great country whom I considered able to both understand and execute the task. Pjotr, a meteorite dealer by profession, did not even reply. Later, I would learn that upon receiving the request he was convinced I was joking. Asking for broken windows from Chelyabinsk was evidently not a request that a serious player in the Russian meteorite business would expect to receive.

I hit the resend button the following day and this time I received his one-word reply: “Impossible!”, he wrote.

This was probably the moment that I started to perceive the matter as a challenge. I mentioned that my friend, an “oligarch” from the US, was interested in the windows and I added a few questions regarding the precise nature of the problems involved. After all, what could be so difficult in acquiring and shipping some broken windows from Chelyabinsk? Promptly I received an enlightening reply. “If you want to locate and acquire such objects it must be done by somebody local. I have been to Chelyabinsk twice. Trading in broken windows will appear quite exotic to the people there. The concept is just too weird – even for Russians” Pjotr summed it up.

Knowing that he would not disappoint me, I kept reminding him of my request over the following weeks. It was already mid-May, and several of the US prospectors and meteorite enthusiasts who had made expeditions to the Chelyabinsk strewnfield had meanwhile returned home – with meteorites and glass shards in their luggage but not with windows. Nevertheless, Dave Gheesling informed me of his expectations that other meteorite dealers would certainly secure windows from the area.



The aftermath in the reception hall of the Chelyabinsk Academic State Theatre is indicative of the force with which the sonic blast wave hit structures. In this prominent building none of the large front windows remained intact. Photo: Nikita Plekhanov

DAMAGE ASSESSMENT



In my mind's eye I tried to picture meteorite dealers, offering broken Chelyabinsk windows with price tags attached – and seriously doubted that this would ever happen.

However, a few days later, I received a first batch of photos from Pjotr, showing damaged roofs, collapsed walls and insulation blasted from various buildings in Chelyabinsk. Much to the discontent of Pjotr, all artifacts were rejected by my US principal, who possessed a detailed mental image of what a proper meteor-blast artifact had to look like. A single shattered window from the city's ice stadium was deemed convenient, but when Pjotr visited the site a fortnight later, the window had already been replaced.

In mid-May, Pjotr returned from another successful field trip to Chelyabinsk. I purchased a number of well-documented meteorites that he had found, and when our deal was completed he casually

Following the catastrophic disruption of the Chelyabinsk body, tens of thousands of small meteorite fragments, slowed down by air drag to terminal velocity fell on areas south of Chelyabinsk. While the damage in Chelyabinsk was caused by the shockwave of the air blast alone, meteorites actually hit structures and vehicles in the villages south of Chelyabinsk, some of them reportedly cracking windows and denting car roofs. One witness, Aleksandra Gerasimova, a 61-year-old retired milkmaid, reported being hit by a small meteorite that tore her coat and embedded itself in the inner lining while she was standing outside with her husband, looking up towards the dust cloud of the meteor. The picture shows a selection of meteorite fragments collected in the first three days after the fall from Deputatsky and Yemanzhelinsk. Photo: P. Muromov



The Traktor Ice Arena, home stadium of Traktor Chelyabinsk, was badly hit by the blast wave. Large parts of the wall cladding and insulation were stripped off and several windows were blasted in. In mid April, when this photo was taken, the damage was still apparent. Photo: P. Muromov



Shattered, double-glazed window on the rear facade of the Traktor Ice Arena. Photo: P. Muromov

remarked that he had also made some progress in the window issue. Finally he had acquainted a local chap named Cyril, who obviously understood the dynamics of the broken window business, and who seemed reasonably capable to be commissioned with the task. Our new hand Cyril had already made some excursions in search for suitable windows, but alas, he reported that most, if not all, of the damage had already been repaired. The fact that someone had actually started looking for our windows was good news, and I appreciated the activity. But in fact, no tangible progress had been made. I almost fainted when Pjotr replied that he had paid the man some advance money, "just a 1,000 US\$" for travelling expenses and a decent digital camera.

Needless to say, this had not been authorized. A 1,000 US\$ paid for the mere prospect of some photos of broken windows? This project is slowly slipping out of control, I thought.

In order to prevent further surprises, I worked out an agreement to cap expenses and to link any payments to actual results. Pjotr was fully cooperative, but I was left with the queasy suspicion that vital parts of our agreement might have been lost in translation.

I discussed matters with Dave and he too was "quite surprised" that the project had suddenly entered a cost effective state. We decided to proceed; it was too late to back out anyway. Fortunately it turned out that the advance payment was invested to some effect. Cyril appeared to be a smart



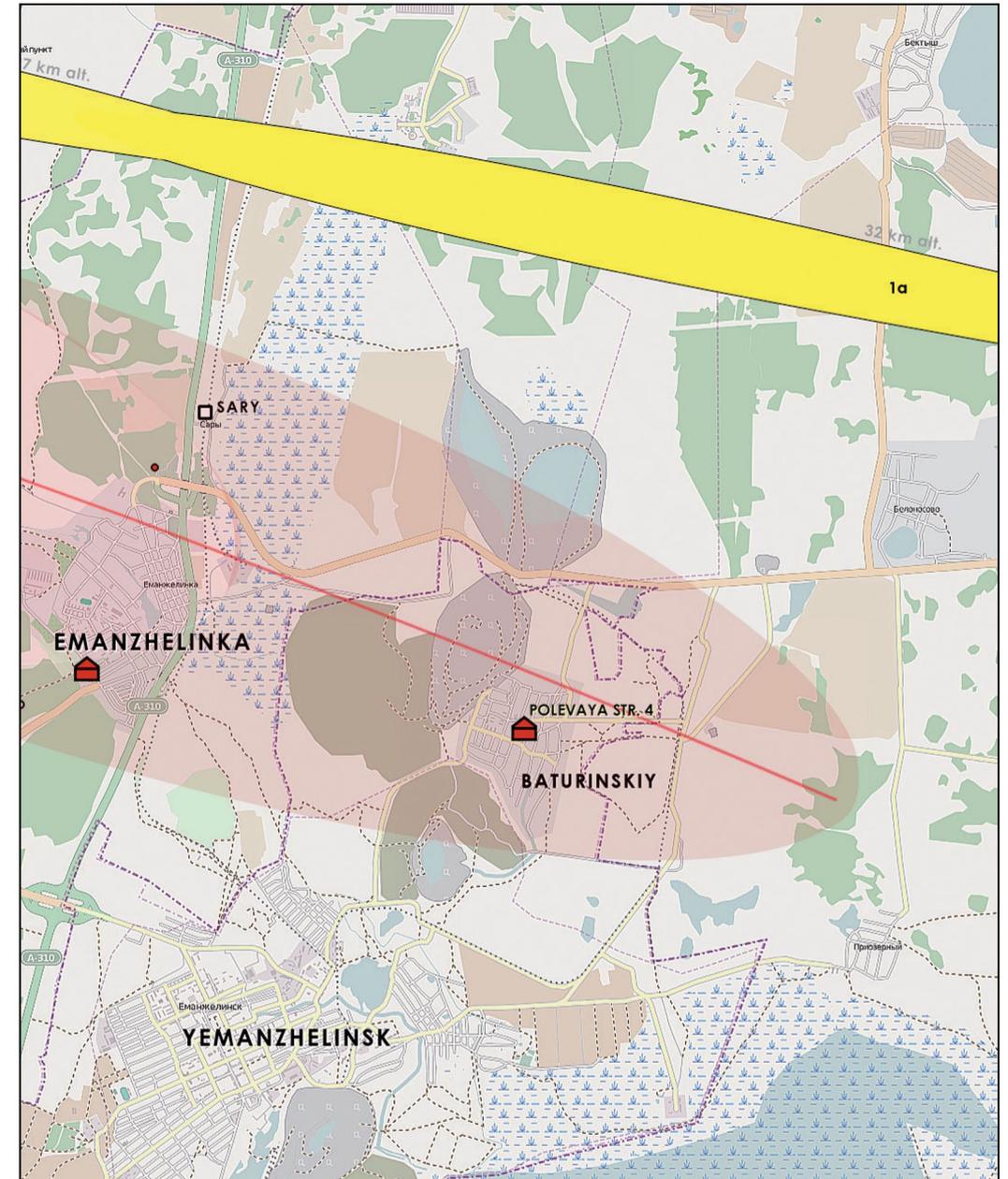
The village sign of the small settlement of Baturinskiy, east of Emanzhelinka in the Yemanzhelinsky District of Chelyabinsk Oblast, Russia. Founded in 1770 as a Cossack village, Yemanzhelinsk has been known as the stanitsa of Yemanzhelinskaya (Еманжелинская) since 1866. It became a coal mining settlement in 1930–1931 and was granted town status in 1951. It was here, in Baturinskiy Razrez, Polevaya street number 4, where C. V. Pisklov finally located a set of windows shattered by the February 15 airblast. Photo: C. V. Pisklov

person indeed. After he had learned that all damages in the area had been repaired, instead of giving up, he showed some initiative. He contacted a local radio and television station, and had his quest for genuine meteor-blasted windows aired in the Chelyabinsk region. He received three calls, not from the city of Chelyabinsk, but from the villages south of the city, from directly under the meteor's trajectory. Two of the locals even lived in villages directly within the boundaries of the meteorite strewnfield. The area was hit harder by the meteor shockwave than Chelyabinsk itself, and a large percentage of the mostly wooden buildings had incurred serious damage. Blasted walls, collapsed roofs and doors propelled into the houses were common in Deputatsky, Zauralsky and Emanzhelinka and I had already received more than one report of damage to cars and windows by actual meteorite hits. Until June it was common practice for the school chil-

dren in these villages to harvest meteorites from roofs and gutters, and at that time meteorites were also still being recovered from gardens and vegetable patches.

Cyril went to visit the people who had called him. Two house owners were ruled out because of their unrealistic ambitions but one lady – more precisely, her three shattered windows – fully qualified.

Weeks earlier I had already discussed a potential problem with Dave: Any window blown in by the shockwave would have lost most of its glass. This was particularly true for windows with insulated glazing, which seemed to shatter more violently than ordinary single glazed windows – the latter of which often exhibited only a pattern of cracks. Unfortunately, most of the residential and industrial real estate in Chelyabinsk was equipped with insulated glazing. A naked frame alone was of little value in terms of evidence for the force of a meteor shockwave.



The house symbol at the coordinates N 54° 47'19"; E 61° 22'12" marks Polevaya street number 4, home of Ludmila Nikolaevna Ovchinnikova. Note the close proximity to the red strewnfield center line (500 m) and to the trajectory axis, with the peak of the first catastrophic fragmentation at 32 km altitude just 5.4 km to the north. Map: S. Buhl; K. Wimmer



Plevaya street number 4 (view from the west across the street). Several small meteorites were found on this property on February 15 and 16, and subsequently sold to visiting "meteorite businessmen". Note the trees and the roof of the gate, from which meteorites were assumed to have ricocheted against the westward wall of the house. Photo by C. V. Pisklov taken on June 1st, 2013

This problem did not arise, however, because the windows Cyril had finally located were perfect in terms of completeness. After the shockwave had thundered over the Baturinsky Razrez settlement, cracking or blowing in most of the village's windows, many of the house owners had repaired them provisionally by fixing the cracks and holes with transparent tape. Thus, on the 1st of July, when Cyril visited the lady who had called him to look at her windows, most of the shattered glass in her windows was still in place.

Cyril had made his find in the perfect location. The paper by Popova et al., titled *Supplementary Materials - Chelyabinsk Airburst, Damage Assessment, Meteorite Recovery, and Characterization* (published in *Nature*, 2013), mentions the severe damage in Baturinskiy in particular. In table S7A, a summary of eyewitness reports is given that lists "severe glass damage" and the wall of a "house cracked", as well as impacting meteorites in the village. The report of Mrs. Nikolaevna, resident of Baturinskiy, confirms this:

On the morning of February 15, at around 09:20 hrs, Ludmila Nikolaevna Ovchinnikova had her family visiting her. They were having breakfast in the kitchen when a flickering light from outside casted strange shadows into the kitchen. So early in the day, the snow covered lane that led to Polevaya street number 4 was usually quiet. Today, there was some shouting on the street. They still wondered what it was about, when a loud explosion was heard. Then, after a long moment of silence, another detonation occurred. Everybody got up from the table when suddenly a tremendous, deafening blast hit the house, heavier than anything the Ovchinnikova family had witnessed in all their life. Glass had shattered and the ground shook under their feet. An evil rolling



thunder followed. Dogs were barking and a car alarm across the street had been set off. Outside, snow was trickling from the roof and the shaken trees. The outer windows were cracked. For a long time no one dared to leave the house. When they did, a snow-white cloud was towering above them in the ice-blue sky. Later that day, they learned about meteorites found in the

"I AM OVCHINNIKOVA LYUDMILA NIKOLAEVNA ..."

Ludmila Nikolaevna Ovchinnikova in front of her 1930-constructed wooden house. The fractures resulting from the meteor's blast wave were provisionally repaired with transparent duct tape in the days following the meteor event. Photo by C. V. Pisklov taken on June 1st, 2013, 18:55 hrs



C. Pisklov and carpenter team removing shutters and damaged windows from Poleyaya street number 4. The transparent tape applied to keep the broken glass in place was left untouched. Photos: Cyril Pisklov

village. Upon checking their own property, the Ovchinnikova family found a handful of small meteorites themselves, two of them in the space between the outer and inner windows. Later it was assumed that these had ricocheted from the nearby trees, and, perhaps from the gate roof. On February 17, Mrs. Nikolaevna sold her meteorites to “businessmen” visiting the village [Interview conducted by C. V. Pisklov, translated by P. Muromov].

On July 1st, Cyril Pisklov, our local operator in charge of window recovery, arrived at the scene with a team of carpenters to secure the three westward-facing outer windows of Mrs. Nikolaevna’s house. A price was negotiated that included the replacement of the shattered frames with a set of new ones, installed by a carpenter of the home owner’s choice. When the two parties had come to terms, a pile of Rubels was exchanged and the actual work began. First, the shutters were removed. Then the windows were carefully extracted from their casings. Since the home was first constructed, the windows had suffered the arctic cold of 83 Siberian winters and the same number of brief, but hot and dry, summers. The three layers of paint that had been applied to them over the years had done little to protect them from the brute forces of nature, but the devastating blast from the Chelyabinsk meteor had certainly finished them off. Little more than the tape that kept the glass from falling out held the brittle frames together. Carefully, the windows were wrapped in blankets and strapped together with ropes. An interview was conducted with Mrs. Nikolaevna, in which she recalled the dreadful events of February 15. To complete the protocol that Pjotr had advised Cyril to follow, Mrs. Nikolaevna wrote and signed a declaration stating the origin of the windows and the nature of their destruction.



"I am Ovchinnikova Lyudmila Nikolaevna, resident of the following address: City of Emanzhelinsk, section (open-cast mining) Baturinsky, Polevaya Street, house number 4. Hereby, in exchange for new windows, I divest to Pisklov Cyril Vladimirovich three windows shattered by the fall of the Chelyabinsk meteorite, which has taken place on February 15, 2013. June 1, 2013, Lyudmila Nikolaevna [signature]". Photo: C. Pisklov

The acquisition of the three windows was a major breakthrough in the project. And the receipt of Cyril's photos of Mrs. Nikolaevna signing the documents put a smile on the faces of everyone involved. Even Pjotr, who at that time referred to the project only by using a phrase unquotable in a public account, found his way back to a lighter mood.

While the price negotiated for the windows themselves had been within the

estimated budget, it still was a considerable sum of money. Associated costs had been piling up steadily. The window project demanded work, money transfers and risky decisions on a daily basis now, and the whole thing was close to ruining my sleep. By the time the windows were finally purchased, it seemed as if I had employed and paid everyone and their brother in the greater Chelyabinsk oblast. The good thing about the current state of affairs was

Я, Овчинникова Людмила
Николаевна.
Живущая по адресу: г.
Еманжельинск, разрез Батуринский
улица Польшая дом - 4
Отдам окна Пискилову Кириллу
Владимировичу пострадавшие
от падения Челябинского метеорита,
унавшего 15 февраля 2013 года.
На замену новых окон.
1.07.2013 г. Людмила

Facsimile of the manuscript. For English translation see caption on the opposite page. Scan: S. Buhl

that we had the objects of desire secured. Thus, the most difficult part of the mission seemed completed. Or at least I thought so.

Meanwhile, Cyril had prepared a shipping box and carefully packed the valuable cargo for its journey to Europe. The next step – indentifying a shipping agent who would transport the precious cargo to Germany – was just a matter of plain logistics. I could imagine Cyril flipping through the Chelyabinsk yellow

pages, identifying a number of transport outfits, requesting offers for the job, and confirming the most reasonable choice within a week or two. But business in Russia apparently didn't work that way. Upon learning that a shipment of three broken windows needed to be transported over 4,000 kilometers on the road from Chelyabinsk to Hamburg, most companies didn't even reply. One agent asked how many freight containers with windows we would

Speditiionsübergabeschein/Bordero

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713 25.10.2013
DEMUCFN166556

Auftraggeber: Herr Dr. Buhl
Telefon: 0178 / 7985082
Mineralientage 2013, Messe München
Halle : A5 Stand:
Tag ADF : 25.10.2013 / 16:10

Markierung	Anz.	Art	Inhalt	KG	L	x	B	x	H	m ³
	1	Packet	Fenster	27,0	1,20	0,60	0,20			0,14
Gesamt:	1			27,0						0,14

Frachtpflichtiges Gewicht: 27,0 KG
Frankatur: Frei Haus
Lager : Lg I-4 / 23.280 **Tag Einlagerung:** 25.10.2013

Kennzeichen:
Unternehmer:
ETD: ETA:

Vermerk:

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Name

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Kennzeichen

Schenker Deutschland AG
81829 München-Riem
Datum:
Jörg Nixdorf

Handwritten notes and stamps on the cargo paper, including a date stamp '25.10.13' and a signature 'S. Buhl'.

Cargo paper for the shipment of three windows (totaling 27 kg) to the author in Hamburg, Germany from the Munich Mineral Fair, where the shipment arrived by car from Saint Petersburg, Russia, on October 23. Scan: S. Buhl

<p>НАКЛАДНАЯ ОТПРАВИТЕЛЯ (ЭКСПЕДИТОРСКАЯ РАСПИСКА) № члб-04101 От 12 Октября 2013 г. ЧЕЛЯБИНСК ООО «АЕ5000» г. Челябинск, Свердловский тракт, д. 6 тел. (351) 211-40-50</p>		<p>Автотрейдинг® СПБ-ШУШАРЫ ООО "АЕ5000" 454091, г. Челябинск, ул. Кирова, 159 тел.</p>	
<p>ГРУЗО-ОТПРАВИТЕЛЬ ПИСКЛОВ КИРИЛЛ ВЛАДИМИРОВИЧ Телефоны 89043040832 Адрес УЛ. ПОЧТОВАЯ 8/2 Через</p>		<p>ГРУЗО-ПОЛУЧАТЕЛЬ -Артемов Антон Леонидович (4004 №556935) Телефоны 8-921-900-28-38, 8-921-864-26-56 Адрес 195030, г. Санкт-Петербург, пр-т Энтузиастов, д. 47, корп. 1, кв. 126 Через</p>	
<p>Плательщик: ПИСКЛОВ КИРИЛЛ ВЛАДИМИРОВИЧ</p>			

Наименование груза	МЕСТ	Вес/Объем	Упаковка	Особые свойства	Кладовщик
ОКНА / ET	МЕСТ ПРИНЯТО : 1 на складе: 1 вертара 1(у кл. 1).	27.00кг, 0.384куб.м.	ЕТ - 0.384 куб.м.; сек./кр. = 2/1	УПАК ПО ПРОСЬБЕ ОТПРАВ	ЛУКОЯНОВА
		Вес брутто: 27 кг			

Маркировка: АРТЕМЬЕВ АНТОН ЛЕОНИДОВИЧ
* 6 2 E 9 2 W 2 0 1 0 0 3 C 1 0 4 *

Сопроводительные документы: ЗАЯВЛ
РАСЧЕТ ПЛАТЫ УСЛУГ ТРАНСПОРТНОЙ ЭКСПЕДИЦИИ
Выдача груза

<p>Наименование платежей</p> <p>Транспортная экспедиция: S = 1645,06 (0.384 * 280 * 15.30; баз. тариф. 15.30)</p> <p>Доп. услуги: Экспресс экспедиция</p> <p>Доставка от отправителя</p> <p>Хранение</p> <p>Подготовка груза к транспортировке</p> <p>Принем по ассортименту</p> <p>Уведомление</p> <p>Погрузочно-разгрузочные работы</p> <p>Прочее</p>	<p>Кол-во, Стоимость</p> <p>Груз в количестве мест 1 (Один)</p> <p>Вес / Объем 27 / 0.384</p> <p>Получил (ФИО) Артемов Антон Леонидович</p> <p>Паспорт серии 4004 № 556935</p> <p>Выдан 18.09.08</p> <p>Кем 13 от Красноармейского р-на СПб</p> <p>По доверенности № от</p> <p>№ накладной члб-04101 от 12.10.13</p> <p>Дата выдачи 21.10.13</p> <p>Оплачено грузополучателем</p>
<p>ИТОГО подлежит оплате 1645.06</p> <p>В т.ч. НДС (по России) 18% 250.94</p> <p>Без НДС (международное сообщение) 0.00</p> <p>Оплата в филиале-отправителе груза (г.Челябинск) 1645.06</p>	<p>Одну тысячу шестьсот сорок пять рублей 06 копеек.</p> <p>Кассир (фамилия, подпись)</p> <p>Оплата в филиале-получателе груза (г. СПб-Шушары)</p>

Примечание: Опломбирован в присутствии отправителя пл.№ 1885774;
Накладную оформил: Аলেখна Е.В.

Груз выдан
Достоверность и точность сведений о грузе, предоставленных Экспедитору, его свойствах и условиях перевозки, подтверждены. Об ответственности за не полную и неточную информацию, предупрежден. В случае сдачи груза в упаковке, не обеспечивающей сохранность груза при транспортировке, а также без упаковки, либо с нарушенной упаковкой, ответственность за сохранность груза несет грузоотправитель.

Правила оказания услуг:
1. Клиент обязан сдать груз в надлежащей упаковке, обеспечивающей полную сохранность груза при транспортировке, без видимых повреждений. В противном случае ответственность за сохранность груза несет Клиент.
2. Хранение груза на складе Экспедитора более 3-х дней с момента оповещения грузополучателя о прибытии груза посредством телефонной связи оплачивается Клиентом из расчета 140 руб. за 1 кг в сутки. Минимальная стоимость оплаты за хранение - 50.00 руб.
3. Экспедитор вправе не выдавать груз без полной оплаты услуг Экспедитора.
4. Груз Экспедитором принят без внутритранспортного досмотра. Экспедитор несет ответственность за утрату или недостачу груза, принятого без сопроводительных документов и объявления ценности, в размере 25,00 руб. за 1 кг утраченного или недостающего груза.
Подписанием настоящей накладной даю согласие на обработку согласно Федеральному закону от 27.07.2006 г. № 152-ФЗ "О персональных данных" своих персональных данных, необходимых для осуществления транспортно-экспедиционных услуг. Срок хранения персональных данных соответствует срокам хранения документов, установленным законодательством РФ. С порядком отзыва настоящего согласия ознакомлен.

С условиями оказания Экспедитором услуг согласен. Груз получен без замечаний, претензий не имею.
Грузополучатель: /Артемов Антон Леонидович/ (подпись, расшифровка подписи)

Груз выдан в: 17:50
г. Челябинск от: 17.10.13, Иванов АА
Удальцова Илья: SMS 79218642656 Дата: 21.10.13 Вр:чм: 11.48 Произвн обзвон: Удальцова ИА

Cargo paper for the transport of the three Baturinsky windows (27 kg) from Chelyabinsk to St. Petersburg, where they arrived on October 21. Scan: S. Buhl



Fesko Projektlogistik GmbH & Co KG
 Rosenstr. 8
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Datum: 02.07.2013

Ihr Ansprechpartner
 Eugen Fetsch
 Telefon: +49(0)6181/3698670
 Email: e.f@fesko.de

Angebot

Gültig bis: 31.07.2013

Angebot-Nr: AN-00588
Kundennr.: 10414

Nr	Beschreibung	Menge	Preis	MwSt	Gesamtpreis
1	RUS-Cheljabinsk nach D-Hamburg	1	1.300,00	0%	1.300,00 EUR

LKW Typ: Planensattel 13, 6 x 2,44 x 2,60 m // 21 to.
 Collianzahl: 1
 Abmessungen: 130 x 80 x 30 cm
 Warenwert: bitte noch mitteilen.

Achtung: für die Transportdurchführung werden folgende Dokumente benötigt
 - Ausfuhrerklärung (EX1)
 - Rechnung
 - Packliste

Umschalg / Überlagernahme sind vorbehalten.

Standgeldregelung:
 24 Std. für die Beladung, sowie 48 Std. für die Verzollung und Entladung sind frei,
 danach 220,00 € pro angefangene 24 Std.

Unser Angebot ist bis zur schriftlichen Auftragsannahme freibleibend.

Voraussetzung für das Angebot sind freie und ungehinderte Zufahrtswege.

Wir hoffen, dass unser Angebot Ihnen zusagt und würden uns freuen, diesen Auftrag für Sie durchführen zu können.

One of the more reasonably priced transport offers for the shipment of the three broken Baturinsky windows from Chelyabinsk, Russia, to Hamburg, Germany, requesting export clearance papers ("type EX 1") and a packing list. The offer is for 1,300.00 €, which converts to 1,743 USD. Scan: S. Buhl

be sending. The ones that did reply must have assumed they would be dealing with lunatics – and therefore quoted accordingly insane shipping charges.

There was still no realistic option for transport at hand after another month had passed, so I decided to speed things up a little, and requested offers from German-based logistics companies. The first agent asked for an export clearance. I forwarded the request to my Russian contacts, who insisted that an export clearance was not necessary for broken windows. The shipping agent insisted that he needed one. The Russians denied. In an effort to maintain my sanity, I had a Russian speaking friend call a customs office in Chelyabinsk to try settling the matter once and for all. But the officer had little to contribute and hung up on my friend, when he was given the contents of the shipment in question – probably thinking the Germans we were kidding him.

This outcome limited the number of potential shipping agents to those, who could handle customs themselves. The lowest shipping offer I received for the delivery of the 27 kg box from Chelyabinsk to Hamburg was at 1,743.00 \$. Among the various options considered were bizarre proposals that can only be explained by the reckless audacity of the Russian volunteers, who suggested loading the windows in Chelyabinsk, drive them the 4,000 km to Hamburg by car, and then returning the same way.

Shortly before I lost my temper, the ultimate solution presented itself in the shape of another Russian meteorite dealer. I had contacted him with my transport request a few weeks earlier. This gentleman was planning to attend the Munich mineral fair, and would have his inventory driven by car from St. Petersburg to Munich. A box more or less did not matter. I asked

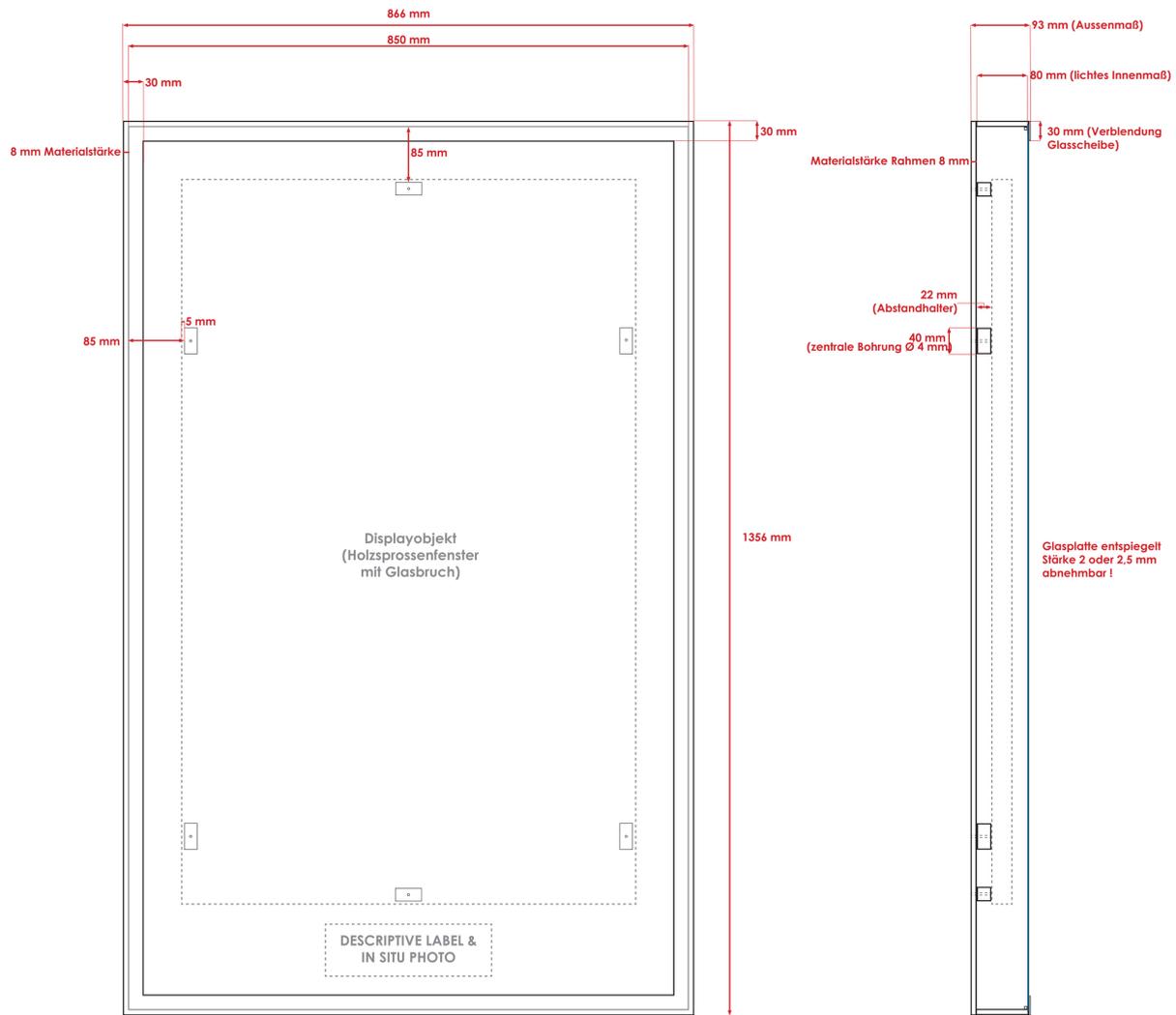
Pjotr whether it was possible, to have the windows transported from Chelyabinsk to St. Petersburg. For a true Russian, Pjotr explained, the 2,000 kilometer road trip was no challenge, and so the box with three windows arrived at its destination on the bank of the Newa just two days after my call.

From there it went straight into the trunk of yet another Russian meteorite dealer's car (Chelyabinsk appeared to have had some effect on the profession) and was expedited in a three day, non-stop road trip to Munich Germany. As expected, custom clearance had not been a problem. When I received the box in a parking lot in front of the Munich fair the export papers were still attached to the crate. Dima Sadilenko, who had captained the windows' journey from St. Petersburg, Russia to Munich, and I hauled the box to his table, where it spent a few hours as an exotic curiosity for the meteorite enthusiasts who visited him there at the show. After a few phone calls I had found a capable transport company with an office nearby. Two hours later, the Chelyabinsk windows were on the last leg of their journey. On November 1st, nine-and-a-half-months after the event that had initiated an operation more complex and challenging than any of my field trips to the Sahara desert, the three broken windows from Plevaya street number 4 finally arrived in Hamburg.

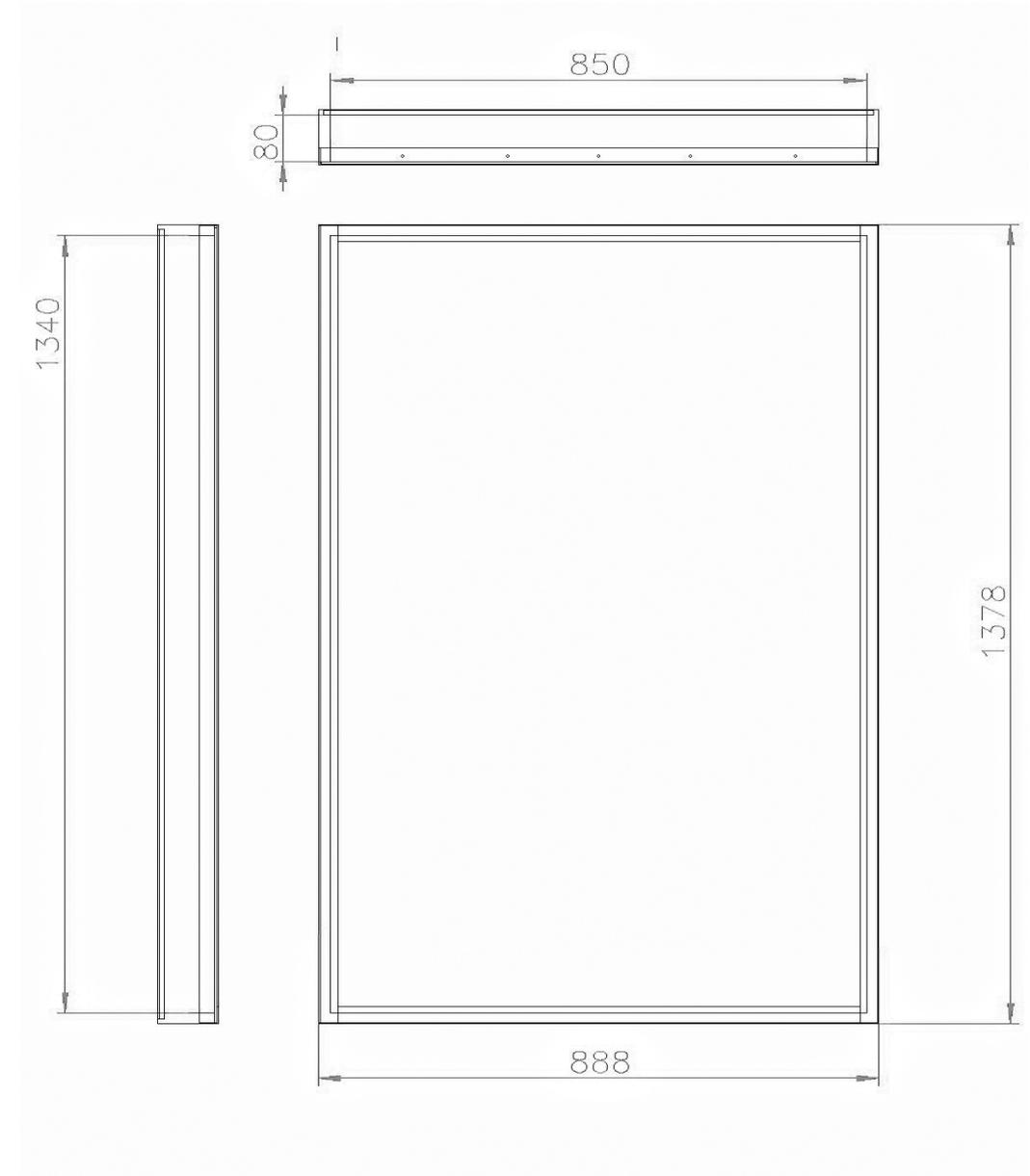
From there, window #1 and window #3 went on their way to Atlanta Georgia. That, however, is a story of its own ...



The final photograph of a serious-looking Ovchinnikova Lyudmila Nikolaevna, standing in front of the yard gate of Polevaya Street, house number 4, in the mining settlement of Baturinskiy Razrez in the Yemanzhelinsk municipality. Three windows, removed on July 1, shattered by the blast wave of the February 15 meteor, rest against the gate. Photo: C. Pisklov



Initial construction drawing for a single-window display case, built from high-polish laminated MDF. It turned out that the initial measurements and the chosen material strength had to be increased in order to create a stable casing for the brittle window. Drawing: S. Buhl



Final construction drawing by the manufacturer of the display case for window # 2. The initial material strength for the frame was increased from 8 to 20 mm. The thickness of the glass sheet is now 4 instead of 2,5 mm. Drawing: CES Manufaktur, Hamburg



Above: Display case of window # 2. No. 2 is the middle window of the westward side of Polevaya Street number 4. Mounted with the window is a 49 g Chelyabinsk individual. Front view (glass removed). Photo: S. Buhl. Right: Descriptive label and in situ photo of window # 2. Photos: S. Buhl

OBJECTS OF EXPOSITION

BATURINSKIY RAZREZ WINDOW # 2

SHATTERED BY THE BLAST WAVE OF THE
CHELYABINSK METEOR OF FEBRUARY 15, 2013

Material:	wood, glass, paint, duct tape
Location:	N 54° 47' 19" - E 61° 22' 12" Polevaya Str. 4, Baturinskiy Razrez, Yemanzhelinsky District, Chelyabinsk Oblast, Russia
Constructed:	1931
Damaged:	Feb 15, 2013, 09:21:38 YEKT
Cause of damage:	superbolide blast wave
Recovered:	Jun 1, 2013

Located only 500 meters south of the center line, and 5.4 km south of the projected trajectory axis, Polevaya Str. 4. is situated within the meteorite strewnfield produced by the Chelyabinsk superbolide of February 15, 2013. The shattering of the window occurred at 09:21:38 YEKT, when the shockwave hit the village, one minute and 38 seconds after the first catastrophic disruption of the fragmenting bolide. Three to five minutes later, meteorites fell in Baturinskiy, of which several were recovered from the property of Polevaya Str. 4.

Meteorite Recon # B-442.W002



Ludmila Nikolayevna Ovchinnikova in front of her 1930 constructed wooden house. The window fractures resulting from the meteor's blast wave were previously repaired with transparent duct tape in the days following the meteor event. Photo by G. V. Piskov taken on June 1st, 2013, 18:55 hrs



ООО «Птицефабрика «Вараксино»
 Юр. адрес: Россия, УР, 427027, Завьяловский район, с. Вараксино
 тел./факс: (3412) 54-51-60 отдел продаж
 Код и адрес производства (код указан рядом с номером упаковщика):
 А. Россия, УР, 427027, Завьяловский район, с. Вараксино
 В. Россия, УР, 427006, Завьяловский район, с. Октябрьский
 С. Россия, УР, 427430, г. Воткинск, Ижевский тракт, 4 км.

Яйцо куриное пищевое
СТОЛОВОЕ
 1 КАТЕГОРИИ

Количество яиц: 360 штук 14 ИЮН 2013
 Дата сортировки: _____
 Яйца соответствуют ГОСТ Р 52421-2003
 Срок годности при температуре от 0° до +20°С - не более 25 суток, при температуре от 0° до -2°С - не более 90 суток со дня сортировки при относительной влажности 85-88%
 Пищевая ценность в 100г продукта:
 белки - 12,7г, жиры - 11,5г, углеводы - 0,7г
 Энергетическая ценность в 100г продукта - 157 ккал.

Продукция произведена на предприятии, СМК которого соответствует ГОСТ Р ИСО 9001.

Упаковщик УА А В С




Sticker on the freight box containing the three Baturinsky windows. The original contents were eggs. Scan: S. Buhl