

International Mathematical Olympiad 2010

UK Students' Report
Astana, Kazakhstan
by Aled Walker

September 9, 2010

Introduction

To complement Geoff Smith's moribund and altogether dull account of the IMO, it was suggested that a student should write a report, and here it is. The format is the well-practised diary layout, and the idea is to give a sense of what it was like to be at the event. I apologise in advance for all the gross generalisations made for comic effect (of which the first line of this introduction provides a case in point) but overall I will try my upmost to be faithful to fact and reality. I want you to remember this pledge of truth, as some of the occurrences that happened may not otherwise be believed. Also, this report comes with the usual health warning/disclaimer that for the sake of humour there will be an unfair focus on the maladies of administration. However, these were in plentiful supply and the account is not unduly curtailed as a result. My opinions on the organisation of this IMO are precariously balanced between admiration, sympathy and annoyance.

The Team:- Luke Betts, Nathan Brown, Andrew Carlotti, Richard Freeland, Sergei Patiakin, Aled Walker

Team Leader:- Geoff Smith

Observer with Leader:- Joseph Myers

Deputy Leader:- James Cranch

Observer with contestants:- Ceri Fiddes (Jacqui Lewis was with the contestants during the pre-IMO training camp in Astana)

Student's Diary

June 30th The gang arrives at Heathrow Terminal 1 at 10:00. After my sampling of some truly disgusting orange & carrot juice (whose intriguing name acted like an angler fish's lure), James distributes various pieces of UKMT fashion solutions. The big disappointment is the absence of Panama hats; the supplying company seems to be lying low. After some repacking, we nervously weigh our cases and embark upon the assault course that is self check-in. We are flying via Moscow, making the process particularly arduous, and the software

prevents one from booking many seats simultaneously. James puts in a heroic performance.

Some hours later we find ourselves with four hours to kill in Domodedovo Airport (we are confined there owing to lack of Russian visas), which we spend finding Geoff some suitable restaurant and then sampling its bill of fare. We locate a pleasant Italian establishment where Sergei initiates his rôle as unofficial translator. The team opt for small pizzas, Geoff for a large one. No comment. Around midnight, we set off for Astana.

July 1st On the flight, I ingeniously manage to fall asleep only during the short window in which edible items are distributed. James comments that in my blue eye mask I look vaguely akin to Robin (of the Batman ilk). When hopes of snoozing become clearly in vain, I get chatting to a Kazakh who it transpires is a physics graduate. His remarkable command of English facilitates conversation about calculus, Astana, the Kazakh language and of course Frank Lampard's 'goal that never was' against Germany in England's recent World Cup defeat.

An air stewardess rushes hastily through the cabin distributing migration cards. We are all distinctly dopey and, trusting the validity of our extremely swanky Kazakh visas, we turn our noses up at this small piece of flimsy card. A few of us purloin them for merely sentimental value. [Absence of migration cards will prove an issue on our departure...]

At passport control, a woman from the ministry has organised a dedicated IMO queue, much to the chagrin of other passengers. We leave the airport (which looks like some green lattice into which a blue UFO has crash-landed) and travel across the stunningly flat steppe towards the spires of Astana. Having fleetingly glimpsed Norman Foster's handiwork we check in at the Imperia G Hotel, which is to be our base during a pre-IMO training camp with the Australian team. It is 07:00 and everyone is jetlagged and hungry, so we take the option of inverting the usual ordering of sleep and breakfast.

In the afternoon, we take on the local shopping centre. Shops selling clothing and jewellery are in the ascendancy, but there is also a supermarket from which we stock up on supplies and notice the ubiquity of Nestlé and Cadbury. We retire from the heat and humidity to the hotel and play cards for many hours in air-conditioned bliss. Eventually we are forced to return to Astana's clammy streets to find food, stumbling back to the only canteen we know (at the shopping centre). The food is of a Turkish nature – James will see his again later that night.

July 2nd At breakfast we eventually meet up with the Australians and their leader Angelo; acquaintance with the latter turns out to be fleeting, as he is leaving for Almaty with Geoff and Joseph that morning. We say our hellos and goodbyes, with only minimal bemoaning of the previous night's abandonment, and proceed into the bosom of Astana's bus system. London tubes seem sparsely populated in comparison. We arrive at the expansively named 'School 62', where the teams will train for the next 3 days, and proceed to not solve questions in the following 4.5 hours. As it transpires, both nationalities have found the exam extremely taxing with only 2 solutions in total.

After lunch, we set the Australians a training paper for the following day.

Out of a choice of 6 questions, it is decided to set an accessible but not unchallenging paper (we do cast out a Chinese training question for being stupidly difficult). This is followed by a literal post mortem on the morning's exam. We return to the hotel, now in the company of a guide, and there is severe faffing over replenishing our bottled water supplies which results in a somewhat calamitous trip to a different Kazakh supermarket. The guide is helpful, but somewhat at odds with the mathematician mentality. She provides the gem, "I want to conduct you to your desires!"

Dinner occurs in a slightly more frequented canteen and we become familiar with a common Kazakh drink, a strange juice which is created by mashing pears and apples together, boiling the living daylights out of them, and then creating an infusion. It is not entirely pleasant. The evening is whiled away by playing a crazy card game called Gluck (introduced to us by the Australians) and glancing occasionally at the World Cup quarter final between Brazil and the Netherlands. The Kazakh coverage doesn't show the score except at roughly half hour intervals – we resort to inferring it from the body language of the players. This proves entertaining.

July 3rd The day proceeds similarly, with us attempting a paper set by the Australian team. The afternoon is spent marking the other team's scripts and then coordinating them, with James and Ivan (the Australian deputy) playing the part of marking police. Luke and I take the geometry, which proves relatively straightforward save for Stacey's mistaken labelling of two different points as R and her subsequent confusing typos, and Tim's sordid trig bash. Richard and Andrew tear their hair out over pages of mostly worthless work on the inequality question. It turns out that one entire Australian, namely David Vasak, was unable to comprehend Andrew's essay solution to the combinatorics question even given the two hours or so that the rest of us took to finish marking all other scripts. James takes pity and offers to save Vasak any more torture.

In the evening we decide on a slightly more upmarket eating establishment, which we are led to by two different and much less wacky guides. Luke and I are attracted by the fruit pizza, and discover that the apple and banana toppings are true revelations. We won't try the orange topping again.

At the hotel, a few of us catch the end of Argentina's highly amusing 0-4 woes against Germany. Football makes a welcome change from the increasingly anarchic Russian and Kazakh music videos that comprise the majority of local television. Vasak postulates that one can tell whence the music video originated by considering which sex is wearing more clothing.

July 4th Our training exam today would decide the winner of the 'Mathematical Ashes', a competition established two years ago in which the Australian and UK teams compete for an urn containing the burnt scripts of the first year's competitors. The previous day, during a game of football, James had tried to increase the UK's chances by cunningly tackling AUS6 Sampson Wong in such a way as to nearly remove a toenail. He claims it was an accident...

After the exam, and following a multitude of photos of both teams with the urn and trophy, we move towards the school's gym to play volleyball. Unlike football this game requires a certain level of physical skill, and it soon becomes

apparent that the majority of us are utterly useless. While we are amusing ourselves, Ivan and James are marking our scripts and at around 6 o'clock reveal that the UK have retained the Ashes, winning 72-68. We are ecstatic, but nobly congratulate the Australians on their fine performance. [Australia will later come ten places higher than us in the IMO proper, so our victory in the Ashes is somewhat Pyrrhic.]

In the evening, a motley collection of Brits and Australians take a guided trip to downtown Astana. The traffic lights at the crossroads by the hotel have broken, so the traffic is being managed by a terrifically proud man twirling an object akin to a miniature lightsabre. We leave him to battle the invisible Sith.

The city has essentially been built in the last 15 years around the former settlement of Akmola, and the result of this is that the 'centre' of town is actually right on the edge of it, a mere stone's throw from steppe that continues for hundreds of miles in every direction. We are greeted by a stunning array of skyscrapers, mostly government buildings or oil company headquarters, and wend our way to the tower called 'Baiterek' – the symbol of Kazakhstan. We ascend into the giant golden ball at its summit, and realise that the name must translate as 'Giant Greenhouse'. Despite creating a minor flood with our collective perspiration, the views are spectacular.

July 5th Today we are thrown headfirst into the welcoming arms of the Kazakh IMO organisers. We greet Ceri, who arrived at dawn, and say farewell to Jacqui. A coach duly arrives, and we proceed in a haphazard fashion across the city, picking up the North Korean team on the way. Luke warns me to avoid at all cost conflating the Democratic People's Republic of Korea (North Korea) with the Republic of Korea (South Korea). [The former will later find themselves at the centre of an IMO storm.]

We arrive at the Duman Hotel, a construction with a stunning 18 storey lobby inside and a giant IMO poster outside – it feels like the competition is really kicking off. We are presented with our colour-coded lanyard. Luke surmises that the entirety of Kazakhstan has been primed to the tune of, "People wearing these are likely to lack common sense and behave idiotically." There is some palaver checking in but we do find the room and begin to inspect our IMO freebies. We have a CD/DVD of Kazakh music and cinema, a T-shirt and baseball cap, a booklet detailing the rules of various traditional Kazakh equestrian sports and an official programme. All this is contained within a stylish IMO branded rucksack. We are intrigued by a certain piece in the programme that mentions that the Deputy Leaders will be given a 'Night of Surprises' one particular evening. All pieces of text are littered with what I will refer to as 'Kazakhlish', but by far the most amusing is the inadvertent use of street language in the opening paragraph of the welcoming address. "I am very pleased to welcome in your face all the young mathematicians of the world!"

At lunch we are suddenly thrust into the company of 100 other teams. The afternoon is spent recuperating, and a Commonwealth game of 'Mafia' breaks out – this largely consists of the Australians bickering.

Dinner requires a leap of faith; the queues build up so quickly that one must choose blindly between one of the two lines of food, and unfortunately these two

sets of hoppers are asymmetric in their produce. The staggered lunch system which had worked so effectively had clearly been abandoned in favour of the easier to implement (but much inferior) ‘every mathematician for himself’. All this said, the team is feeling quite smug about our position, particularly as we have a room to ourselves containing at least as many beds as there are people. On the grapevine, we had heard stories about teams being told to share and then subsequently finding only 1 bed per 3 people. Ceri has to share with a Korean Observer, despite both of them having paid for single occupancy rooms. However, our smugness is short-lived.

At 23:30, just as we are all dozing off, some hotel staff knock on the door and try to bring in 4 extra beds. We are adamant that, although some other rooms might be in need of more beds, ours is not one of them. Sergei is summoned and the message seems to be understood. However, 5 minutes later they return with information that in fact we do need the extra beds, as we are to be joined in the small hours by 4 members of some unknown team. There is some consternation but we have no choice but to accept. Sergei, possessing more common sense than the rest of us combined, decides the most sensible and gallant thing to do is squeeze a total of 6 beds into the main living room and for the UK team to use these, thus allowing our guests to slink into the other more luxurious bedrooms with minimal disturbance. This is a great idea, save for the fact that these new beds are really just pieces of plywood balanced on a wooden frame. Sergei’s is particularly rickety (he describes it as in “unstable equilibrium”). Around 01:00, I don my eye mask and retire to patrol the streets of Gotham City.

July 6th Opening Ceremony day! A less-than-perfect night’s sleep; keeping the air conditioning on in a room filled with 6 people is generally desirable, but through some peculiar configuration of vents I end up sleeping in an arctic gale. We awake (Sergei with a particular thump as his plywood fell through the frame) to find no guests in our room! We feel tired, grumpy, and ridiculous. Breakfast contains more ‘hopper guessing’.

Our IMO guide Gulbakhit informs us that we need to be on the coach by 09:00. Most of the guides are students at a language school, but ours is a teacher and proves to be extremely competent indeed. In this instance she is perhaps too skilled, as although we arrive on the coaches at the correct time it takes another 45 minutes for all of the other teams to embark. This is mostly due to the cataclysmic effect of 600 departing mathematicians on the hotel’s lift system. Hopelessly late, the long convoy begins its journey across the city with police escort.

The Palace of Independence is a truly stunning setting for the ceremony. We enter and exchange manic waving with Geoff before taking our seats between Ukraine and the USA. There are many opening speeches (alas no verbal repetition of the ‘in your face’ debacle) and József Pelikán gets the biggest round of applause of the lot for speaking a sentence in Kazakh. The acts are many and varied. We are greeted by a myriad of small children running amok onstage, wearing T-shirts bearing the numbers 1–10 and various mathematical symbols. There is the requisite traditional dancing and a massed youth dombra (a traditional Kazakh mandolin-like instrument) ensemble, with a particularly stocky

bloke taking on the bass balalaika. They possess a fine ‘subito piano’. The headline act is a bizarre heavy metal group called Ulytau. We are first treated to a promo video narrated in a thick Yorkshire accent. Then the band comes on and quickly strikes up Mozart’s much butchered classic Rondo alla Turca! They are led by a violinist clearly gunning for Kazakhstan’s as yet untapped Myleene Klass market. The Mozart is surprisingly invigorating, and a few pieces later the dombra player is given an extended solo spot – his virtuosity dazzles the crowd, although mathematicians are conceivably a more sedate audience than their usual groupies. The UK team look quite dapper in our UKMT shirts and ties, but are outdone by the Mexican sombreros and South African vuvuzelas. The spectacle finishes with everyone back on stage and two people singing a song involving repeated use of the word, “Astana.” Halfway through, the male singer decides that he has had enough of miming and starts geeing up the crowd instead. His ventriloquism is exemplary.

Lunch is a minor fiasco, as having waited very Britishly in an interminably long queue, we eventually arrive to discover an distinct lack of plates. Enough of these are eventually found to satisfy the angry mob, and furthermore we manage to persuade the Irish team to bequeath their seats to us. Sustenance is gained.

The competition itself will take place at a camp called Baldauren, which translates somewhat sickeningly to ‘honey adolescence’, and after the opening ceremony we embark on the 5 hour coach journey. We travel in a long convoy, which grinds to a halt at periodic intervals to signify that one or other of the coaches has bitten the dust. There is a pit stop halfway, with only one loo between 800 or so. [We later discover that there had been prepared a far better equipped lay-by, but that the convoy had stopped at the wrong one.]

We eventually arrive in the lakeside retreat at 21:15. With the first exam the following morning, everyone is keen to eat dinner and get as early a night as possible. The camp is adamant that we should be given their full welcome, but it would appear that only a certain number of mathematicians can be welcomed at any one time. We are held back to wait for the welcoming party to ‘reset’, whilst Ceri dashes inside to see the lay of the land. When we are eventually released, we amble down the drive and meet her on her way back. She describes utter pandemonium, and warns us to dodge the gauntlet of welcoming dancers and ensure that we are the first to be shown to our room from this batch. Such dancers duly appear, and we do as instructed. This is successful; we cut through the baying crowd and our small but perfectly pleasant room is quickly located.

Events proceed from the sublime to the ridiculous. It is now around 22:00, and our ever-wonderful guide informs us that we are in the second dinner sitting but that we might be able to smuggle ourselves into the first breakfast sitting. However, there is no sign of any dinner, and having not eaten for 8 hours we are somewhat ravenous. We investigate the canteen, but a large number of ‘security waiters’ firmly turn us away despite Sergei’s best efforts, and we are told to return at 22:30. We do, and there is still no food. Any mathematician knows that a good night’s sleep is the most important problem-solving tool one can employ; at 22:45, Luke, Richard and I decide that it is of a higher priority

even than food. We consider taking to the forest to forage for berries.

The others eventually make it into dinner and find that the limiting factor is not the size of canteen but the number of waiters available to deliver food to the tables. We grumpily wonder how this can be the case given the myriad of dancers seen earlier, or indeed the large amount of ‘security’ on the canteen door. They bring back some bread, and we combine this with fruit given to us by Ceri and James that morning, having themselves been presented with a fruit platter by the Duman Hotel as an apology for Ceri’s rooming problems. She herself was being shipped off to another hotel due to lack of space, making a mockery of the title ‘Observer with Contestants’. Morale is low, with the only joy coming from our fluorescent floral bedding. We drift into an uneasy sleep.

July 7th We had been previously informed that breakfast would be 07:30 – 08:00. However, considering the difficulties of the previous evening we had assumed that as we were second sitting we would not be allowed in until at least 07:45. Considering that the exam would not start until everyone had had breakfast, and trying to maximise our sleep, we had planned to get up somewhere around 07:45. [Later, we discover that the Irish Deputy Leader Gordon had been working the phones trying to organise an extra hour of sleep for the participants, considering the extreme tardiness of our arrival the previous evening. He was strongly rebuffed.]

We are rudely awoken at 06:30. Once I come to my senses, I realise that this is because ‘Peer Gynt’ is blaring out of a centralised speaker system, followed by an impassioned rendition of the IMO hymn. This is the low point of the fortnight; we feel that Baldauren is subjecting us to intense psychological torture designed to disrupt our mathematical function. Vasak hotfoots it to our room, shaking with rage, and pressgangs Nathan and then Sergei to assist his tirade at Reception. Eventually, the music stops. We stumble into breakfast, finding a table marked with ‘Great Britain’. The meal, consisting mostly of semolina, is remarkable in the fact that it exists.

And so to the first exam. The organisation for this seems to be in the hands of a German, Dierk Schleicher, and so runs remarkably smoothly. [It is later revealed that Dierk had, 4 days previously, uncovered some unfortunate oversights of Kazakh exam provision, namely toilet facilities and clocks.] Our exam pack comes with 5 handy colour-coded cards. These can be waved to request more paper, a trip to the toilet, more water, for a question to be sent to the jury, and general help. At lunch there is some discussion on what manner of chaos would ensue if one waved all 5 cards simultaneously.

I dispose of the first problem in around 40 minutes, so my thoughts turn to problem 2. This is on geometry, perhaps my favourite area, so I am confident of making inroads. Over the next 4 hours, having made no discernable progress, my breeziness wanes considerably. The problem concerns an oddly constructed point G , and try as I might I could find no purchase on this point, and thus neither on the problem. Problem 3 looks beautiful in its symmetry but I only get to address it for a short period, after I eventually lose hope in the geometry. Discussions with the rest of the team uncover that my experience is far from unique – only Sergei claims a problem other than problem 1. It transpires that

Vasak had utilised the opportunity for asking questions to the jury as a means for notifying them about the morning's extreme Grieg experience. His reply was, "Your message has been noted." He is satisfied.

Serendipitously, whilst on a stroll down the drive I happen upon coaches arriving from another hotel containing Deputy Leaders and Observers, and spy James waving. All the team have a discussion with him about what they thought they'd solved, and spend the afternoon recovering their strength. At dinner, the catering systems suddenly work wonderfully! The only concern is that the waiters just add plates of food to one's table, never taking anything away. By the end of the meal, there is not a glimmer of wood to be seen for the myriad of meatball dishes. 6 growing lads around this groaning piece of furniture is quite a squeeze, and there is some concern that the entire ensemble might suddenly collapse.

I go for an evening saunter, and observe Nathan playing 'attacking central defender' in a game of n -aside football. As I gaze on the tranquil water and breathe the soupy air, the choice of Baldauren as the contest location is beginning to make sense. Sleep beckons.

July 8th The 2nd exam! Vasak's complaints seem to have been noticed, as we are spared the schmaltzy dawn chorus. The existence of breakfast now seems but a mundane reality – what a change from 36 hours previously!

So to the paper. Question 4 is an 'easy geometry', which I approach with trepidation owing to the UK team's collective mind aberration on the previous day's geometry problem. After spotting an alternate segment theorem trick, I decide to proceed by a 'My First Geometry Book' method (i.e. label every angle there is and aim for some algebraic nicety). This is generally speaking an extremely bad idea, and rarely works at IMO level, so I am highly surprised when 5 minutes later it seems that I have solved the problem. I am so flabbergasted that I convince myself that I must have made a mistake, and go through all my working again. Unable to find the error, I reluctantly accept my solution.

Spirits high, I throw myself at question 5 and this is where everything starts to go wrong. The question involves a very large number of coins, $2010^{2010^{2010}}$, which is enough to amply reward the mere 2010^{2010} 'children at a maths camp' that featured in BMO2 this year. I play around with the combinatorial scenario, but do so in an extremely imprudent and foolish fashion; it takes me 30 minutes to generate a number of coins over 100, and 2 hours to generate a number over 1000. When faced with the sheer immensity of $2010^{2010^{2010}}$ in comparison to my offerings, combined with the fact that the number of coins is bounded, I propose that creating such a number is not possible and go about trying to prove it. 4 hours later, I had failed to do this and was extremely grouchy. [As you may have surmised, I had missed a clever 'move' that generated large numbers of coins, and armed with this I quickly completed the proof that evening. Oh well.] Luke and Richard share my bemused befuddlement, as they had had an identical experience. We are all excited by Andrew's claim at question 6; both by the possibility of a solution and the racing certainty of its incomprehensibility [remember Vasak's experience of marking Andrew's work in training]. In my 'debrief' with James, he confirms my gut feeling that I am precariously placed

on no medal/bronze medal borderline. My pessimistic dæmon tells me which side I will fall.

Our toilet is blocked and has started to pong. Sergei makes the appropriate noises to Reception about the need for a plumber, and we escape this odour to go on the first of many excursions. The experience is mixed; the short forest walks are most definitely charming, but the squalor of the local zoo is most definitely not. It is located next to a museum boasting an impressive collection of stuffed wildlife, and I propose that this proximity is to ease the transportation costs from cage to cabinet.

To kick the post-exam period of the IMO off, our hosts hold an evening concert in the camp's amphitheatre. The audience starts by resembling a collection of nervous and uneasy mathematicians, but then the Irish arrive and decide that this is a party waiting to happen. After a few stochastic efforts, they initiate multiple Mexican waves, and within 10 minutes the entire crowd is on their feet and 'grooving' to the music. There is even a minor (2 person) stage invasion. The holiday has arrived!

July 9th After a sedate rising, and escape from the almighty stench of our bog, we head to the provincial capital Kokshetau, where a concert is to be given in our honour. As is now customary the coaches take several eras of civilisation to leave, but once on the move our spirits are buoyed by an engaging mother and daughter double act, masquerading as guides. Despite being slightly too jolly and inquisitive, they are kind and genial with excellent unintentional comic timing. Meaning to say, "In those fields, we grow lots of wheat," the daughter comments, "In those fields, we grow lots of weed." Fortunately, both we and they see the humorous error and so share the joke.

We arrive at the Palace of Culture an hour-and-a-half late, but are nonetheless greeted by an enthusiastic junior brass band in full regalia. Meeting Ceri, it transpires that her guide had encouraged communal singing of "If you're happy and you know it, clap your hands." We got off lightly. The concert itself is utterly incredible, and unique amongst all human gatherings that I have previously attended. To cruelly summarise, the first half consisted of a traditional Kazakh orchestra augmented by cellos, timpani and double bass, accompanying a number of singers. Their styles ranged from operatic to guttural yodelling. The second half is a whirlwind of act after act. Those deserving particular mention are a Michael Jackson tribute number, involving many moonwalks, and a dance routine featuring dancers dressed up as a cross between ostriches and food colouring (bent double, with their bodies hidden behind a huge feather ball, and a lone hand in the air to emulate the bird's head).

But pride of place must go to the act announced as 'hip-hop'. First, dancers come on dressed like Minnie Mouse. Then a singer starts doing his stuff. Then some children in clown outfits run on and join in the increasingly farcical melee. A microscopic tot with a balloon is ushered onstage and jumps about. Seemingly immune to the chaos surrounding him, the singer just keeps on going. Maybe our guide was right about the weed – it seems as though I must have inhaled some. All the while, coordination results are filtering through via text. Luke is apoplectic with bewilderment as to his part marks on questions 2 and 5, having

been convinced of the worthlessness of his scripts for both those problems. We also get the news that Geoff has been elected to the Advisory Board (Ceri calmly asserts that he had rigged the voting system so that he would win) and that North Korea have been disqualified. We are shocked but decide that speculation is pointless. [To add a brief comment to Geoff's discussion of the issue, all of the team found their North Korean counterparts extremely amiable companions.]

Back at the ranch, the toilet has been fixed and I get my laundry back. There is a disco, Kazakh style. This consists of the hotel staff dancing in the middle of a giant ring of contestants, who are instructed to copy their moves. It is certainly oxygenating. The evening is slightly soured for me by the mislaying of my camera. Our wonderful guide phones our coach driver, who looks for and then finds the camera on the coach. I am forever in their debt. Meanwhile, back at the party, the blood vessels in Luke's nose have given way under a particularly expressive double twist. Luke knows that it is a minor ailment but the medical staff, convinced that he is about to die, cart him off for treatment. We learn that 5 of us have secured full marks on question 1, but that Nathan's script has had to be adjourned for tomorrow. There is some worry about his 7 lemma behemoth. We spend a mad evening with the Irish and the Scandinavians.

July 10th We have another excursion, to an archaeological site. There is chaos. It becomes apparent that lunch boxes and water are being dispensed from a van, but no one knows who's allowed to get them or indeed what the hell is going on. It resembles the clamour around a humanitarian relief depot. Bus 3 (aka our bus) has broken down, so our ever brilliant guide secures us positions on another coach. We view our itinerant Bus 3 comrades wondering lost along the bus queue, quite possibly tramping for days without finding a free seat. Then, magically, our bus becomes fixed and appears outside the camp; we relocate to our intended residence.

The journey is ferociously long (3.5 hours each way). On the outbound trip, the road narrows to a single lane and then a dirt track. This is exciting! Then, inevitably, we discover that this is because the coaches have gone the wrong way and need to turn around. The driver is astonishing in his skill, but the entire experience is terrifying for us as the track is raised some 2 metres above the surrounding countryside – at the extreme of the turn we feel like we are dangling over the edge of oblivion.

We arrive in a field filled with dried horse manure and gingerly shuffle towards yet another welcoming ceremony, adorned by the worst PA system known to humanity. The archaeological dig itself is wholly fascinating, being a cross-section of a Stone Age burial mound. But it is only a brief delight, as we are soon on the coaches for the long return journey. At Baldauren, we congratulate Carlotti on his 6 marks on problem 6 and amuse ourselves greatly in discovering that the cause of Nathan's lengthy coordination was centred on his illegible handwriting! [I have been at school with Nathan for 7 years and have constantly derided him for his untidy scrawl – I now have international corroboration.] A lengthy chat with the German team reveals that many of them intend to apply to Trinity College Cambridge, the destination of choice for UK IMO team members. We give what advice we can about the admission process.

Late in the evening, there is a game of ‘Capture the Flag’. I am not familiar with this pastime, but many gleeful people clearly are. It apparently involves territory and finding a flag, but not getting caught. There is universal astonishment that the camp authorities have allowed the students/prisoners the freedom to play this game, but it appears that this was because they didn’t know about it. By 23:00 they have found out, and promptly terminate its frivolity. The guides get an earful about permitting it in the first place, which is highly unjust. After this, the buzz in the corridors is about where the bronze medal boundary will fall – estimates are 14, 15 or 16. [If we had been in possession of total information, then we would have known that 14 was never going to be a viable decision, but as we didn’t the speculation was rife.]

July 11th It is the World Cup 3rd/4th place play-off between Uruguay and Germany. The match starts at 00:30 and is being screened in the ‘Concert Hall’, in a wing of the building that is completely alien to us. It is a popular destination and the venue is far too small, but this serves to produce an astonishingly intense atmosphere with even a few vuvuzelas thrown in. The Germans stand up for their national anthem. There is no Uruguayan IMO team [I berate their misplaced priorities] but nonetheless there is a strong South and Latin American contingent. 1-1 at half time – I go to bed.

Today is a rest and relaxation day. We leisurely stroll into breakfast, but find that it had been served much earlier and our semolina is now stone cold. Some time later, I play exchange chess with a few members of the American team. For those unfamiliar with the concept, the game is played in teams of two (each member of a team playing a different colour) and is like normal chess, except that when a piece is captured it is passed to one’s teammate. They can then, instead of moving a piece of theirs already on the board, place one of the pieces that their teammate passed them. The game ends upon checkmate on either board. Custom dictates that the game also be played at speed. This variant does little to increase intellectual and emotional control in the players but, particularly in this instance, it proves excellent for international relations. Before, during and after a gigantic photo shoot with the other teams, we distribute our UK gift of UKMT-branded playing cards. These are a great success, and every corner of the camp is soon filled with huddled posses using them.

Now, according to Luke, every year a Canadian cuddly toy moose (their mascot) is stolen and secreted by one of other of the teams. This year it was the Norwegians, but they needed somewhere to stash it temporarily and our room was chosen for this purpose. Apparently this was a great honour, to be in possession of a stolen Canadian moose at an IMO.

Having been issued with various Baldauren-branded gear (T-shirt, cap, brochure in case we wanted to come again etc.) we congregate in the amphitheatre for a farewell late afternoon concert. We have to learn a Kazakh phrase to communally shout out at the appropriate point in proceedings, the phrase being “biz sulumiz baldaimiz, Baldaureindi tandaimiz.” Our guide gives us the rough translation as “We are handsome, we are cute, we choose Baldauren.” Owing to this, Luke and Nathan decide to give the concert a miss. Indeed, the whole ‘Butlins-esque’ shouting and clapping is thoroughly unpleasant, although Sergei

enjoys being able to intercept the esoteric messages being shouted in Russian to the guides, such as “Control your children!”

The concert itself consists of a vast multitude of acts, certainly edging towards the power set of the world human population. Of particular interest is a Michael Jackson impersonator/male castrato [yes another one, and this won't be the last]. When singing 'Billie Jean', he leaps into an aisle and fetches a girl from the Chinese team (known affectionately by us all as 'The Chinese Girl'), dragging her up on stage. Language barriers present themselves and the result is The Chinese Girl standing utterly terrified for a minute or more.

Following the concert is the Miss IMO contest. We cheer madly for Vicky from Ireland but then decide that, even given the delights on display, the prospect of dinner is a more attractive option. We hear that, as a wonderful sign of collective sympathy and solidarity, The Chinese Girl won.

Ceri joins us and is texted the medal boundaries – 15, 21, and 27. Sergei is understandably ecstatic and runs out into the corridor to tell the world, followed closely by Nathan, Andrew and Luke. We hear yelps of delight from the New Zealanders next door, who have scored almost maximum 'medal efficiency', as it were. There are many happy people; Richard and I stoically crack open the chocolate biscuits.

July 12th I wake up at 00:30 to watch the World Cup final, which is being projected on a big screen in the amphitheatre. It is cold, but we huddle under blankets. 115 minutes in, Spain score and their respective IMO team get up and dance on the stage; at the end there is cordial shaking of hands between them and the Dutch mathematicians.

2 hours of sleep later, and it's time to leave Baldauren and its 'honey adolescence'. After catching an amazing sunrise over the lake, the team is now assigned to Bus 0. This bus is too small for all the teams that have been allocated to it but, when the authorities arrive to perform some sort of headcount, they only seem concerned that there aren't enough people on the bus. Luke and I have discovered a shared obsession with the Pink Panther films, and so discuss this issue in our newly-adopted Inspector Clouseau accents.

During the journey and in the middle of nowhere, which in Kazakhstan really does mean 'nowhere', Calvin (USA) has a seizure. The convoy stops, the ambulance travelling with us is summoned, and Sergei supplies the appropriate translation for 'seizure'. After the incident, there were some students who were appalled at the Kazakh handling of it (i.e. asking Calvin to walk off the bus when he was still unconscious). However, in my opinion, this was a star moment for all the Kazakh organisational efforts. Had the ambulance not been there, there could have been a serious problem. As it was, I saw Calvin that evening and, although a little shaken, he was alive and in full spirits. Well done Kazakhstan.

We drive through Astana, and straight out the other side again. This is perturbing as we fear another infinite torpor on the coach. However, our destination (an equestrian centre) would seem to only be 5 minutes out of town. We see a large crowd of people cowering in the shade provided by the grandstand covers – we presume that these are the team leaders and deputies. We are armed with the description of Kazakh equestrian activities given to us in our

original freebee pack. The English is terrible, and therefore brilliant, but parallel Russian text allows Sergei to inform us that the original explanations are perfectly sensible. “To whip” seems to have been translated as “to stitch” and “a whip” as “a creeping stem.” Most worrying is the horseback equivalent of ‘kisschase’ (described in Geoff’s report); the Russian would appear to declaim its title as “Catch up with the girl,” whereas the English has the somewhat affronting “Come up your girl.”

Afterwards we are reunited with Geoff, who is incorrigibly happy about everything and congratulates us all on our performance, although he accuses Sergei of over-performing. He is whisked off to a yurt (traditional Kazakh hut) and we have to fend for ourselves at an outside buffet. There is a severe shortage of forks. Geoff recounts some of his experiences of the Kazakh organisational niceties, such as the point at which no one knew how many contestants there actually were.

The coach to the hotels initiates more pandemonium, of a very similar nature to all that had occurred previously – many people plonked in the same place with no information. By a huge stroke of luck, we have been ordained to dwell in a plush and expansive establishment with only a few other teams. The Americans arrive, but without their luggage, and the New Zealanders’ luggage arrives but without the customarily-attached New Zealanders. Richard and I investigate the pool – this proves to be a good idea.

We hatch a plan to eat out, a celebratory dinner in Astana. The leaders are at the Duman, and after looking at a map we arrange to rendezvous by a particular bridge located approximately halfway between the two hotels. We surmise that, as Astana is a modern city, there will be chic little bistros along the riverside for us to use for our meal. Of course there aren’t, and we end up walking all the way to the Duman Hotel to eat with everybody else. Coincidentally, we arrive at the same time as the aforementioned ‘everybody else’ and hotfoot it to the dining room to avoid the massive queues that we know will develop. This involves negotiating the revolving doors into the hotel, which were clearly not built to handle the flow of 600 mathematicians. Shortly after our traversal they jammed, trapping many unsuspecting adolescents in their grasp.

Following dinner, we take a quick look at the jury room and grab the final daily IMO diary/collection of falsehoods produced by the officials. We sleep.

July 13th Closing ceremony day. We aim to get to the Duman by 12:00, but I have reacted unfavourably to some foodstuff consumed the previous day and stay at our hotel a little longer to recover. I rejoin the others after a walk across muggy Astana, and discover that the UK IMO uniform shirts are designed to show up sweat in the most embarrassing way conceivable.

Entering the Palace of Independence, we get the red carpet treatment. Countries file in alphabetical order, and are flanked by a small selection of applauding locals – all accompanied by deafening brass fanfares. In the ceremony, there is more ‘folk rock’ and another rendition of Billie Jean. I feel, hopefully substantiated by others who attended the winter training camp in Hungary this year, that this song is never the same once you have heard a Hungarian 5 part ‘a capella’ version. In the medal presentations, Luke wears his flag to look a bit

like Superman, and Nathan is completely obliterated by a neighbouring Kazakh flag and associated student. Sergei has his flag the wrong way up, and ignores our mad gesturing – Geoff gets the message across.

The ‘Farewell Dinner’ causes more calamities. There are those who erroneously believe it to be in the same location as the ceremony, but the canteen is deserted of all life. We are bussed back to the Duman, where all logical souls once again crowd through the revolving doors. However, as in all classic thrillers, the actual entrance is to the left (hidden in the shadows). We enter to find a large high ceilinged room containing many tables, including one labelled slightly confusingly as ‘Great Britain’, not ‘United Kingdom’. No matter, our sudden change of alphabetical placing has positioned us near the drinks table and a helpful waiter, who sees it as his duty to top up our glasses the moment a drop has been drunk. This occasion is another event managed particularly well, with a pleasant relaxed atmosphere and good food. This is the perfect platform for Geoff to pass on the ‘Microphone d’Or’ – the multinational presentation is a theatrical tour de force.

The Australian team continue their attempt to surreptitiously offload all their remaining miniature toy koala bears onto passers-by. Geoff is ‘got’, and walks off to bed, unbeknownst to him the fact that there is a koala hanging from his collar. There are many goodbyes, the final one being to our guide Gulbakhit in the Duman bar. Sergei wisely suggests packing before going to sleep, as we have an early departure.

July 14th It is time to say goodbye to Kazakhstan but, before leaving, this remarkable country has a couple of parting shots. We need to get to the airport for 04:00. Earlier, we had learnt that the organisers’ plan was to lay on a coach that would make various stops at the different hotels, picking the team up at 02:00. This had seemed ludicrously early, so Ceri had booked private taxis to pick us up at 03:30. IMO officials had been told about this.

However, having set our alarms for 02:50, Sergei and I are quickly greeted with agitated knocking from a person in a yellow IMO T-shirt, who informs us that our bus is here and that we must get on it. I try to explain our changed plan, but to no avail. As has become a familiar action, I summon Sergei who tries a similar attack but in a more appropriate language. He is then surrounded by a 3-strong Kazakh contingent determined to get us on this bus, because apparently the airport would be heaving and only arriving with the main party would get us through! Eventually, after convincing our tormentors that UKMT accepted full responsibility for however dramatic an accident happened on our sojourn to the airport, we are released. On arriving there, we find it practically deserted.

There is almost no more incident. A few of us (including me) face some difficulty through Kazakh passport control owing to our lack of migration card, but the double-whammy of, “International Mathematical Olympiad,” and, “London Heathrow,” secures my departure. Flying west, we are constantly served breakfast for the next 6 or so hours before arriving in a damp United Kingdom.

Conclusion

I never thought that I would get into the IMO team. I see it as an enormous honour to have been chosen to represent the UK, and a similarly enormous privilege to have been able to visit such an extraordinary country. On a trivial level, the competition was a disappointment for me; I didn't get the bronze medal that I knew I was capable of. However, socialising with some of the most exciting, vibrant, engaging and intelligent young people in the world was a joy that completely masked any pangs of discontent. Of course there were administrative and organisational miscalculations, maybe a few more than usual, but with the gift of hindsight these problems fade into insignificance. Going to an IMO is a unique experience, and I count myself extremely fortunate to have been given the opportunity to enjoy it.

There are naturally many people to thank, almost all of whom are duly noted by Geoff in his report, but I would like to express gratitude to two special individuals. Firstly, to our guide Gulbakhit, who was perhaps the only island of calm and serenity throughout the entire competition. Without her compassion, empathy and proactive stance during the low points, our experience would have been far less pleasant. The second person that eludes personal thanks in Geoff's report is Geoff himself. Although he is a largely absent presence during an IMO from the team's point of view, we know how hard he is working, setting the paper and marking our drivel. However, leading the UK effort at the IMO is only a small part of all that Geoff's rôle (as he has fashioned it) entails. There is now a well-established yearly schedule of training and selection camps, many of which have only come into being as a result of Geoff's initiative and actions. All of the team, and many more young mathematicians besides, owe these camps and Geoff a huge debt of gratitude for stimulating their mathematical development. In his new Advisory Board rôle, I am sure that Geoff will continue to steer the IMO on a successful course.

When reading a newspaper article on mathematical education in schools, I was appalled at the lack of any mention of UKMT, even when discussing options for stretching the brightest students. This is perhaps indicative of the absence of acknowledgement for this wonderful organisation. I realise that I am preaching to the converted, as it were, but nonetheless it is important that we do show recognition. UKMT is one of the only organisations that give real maths to young people. In a curriculum overflowing with arithmetic, constantly bombarded by misplaced government initiatives and the growing 'Vorderman threat', UKMT offer steadfast, consistent and high quality material. Let us hope that its current success continues and grows – it is the bedrock of UK mathematics.