

TRANSITIONS

AN INTER-DISCIPLINARY COLLABORATION

VOL 2 August-September 2019



GLOBAL WATER FUTURES

**AN ART-SCIENCE PROJECT
CLIMATE CHANGE IN CANADA**

**PROFESSOR JOHN POMEROY
PROFESSOR TREVOR DAVIES
ARTIST GENNADIY IVANOV**



globalwaterfutures.ca



GLOBAL WATER FUTURES: SOLUTIONS TO WATER THREATS IN AN ERA OF GLOBAL CHANGE

WARMING RATES IN NORTHWEST
CANADA ARE AMONGST THE GREATEST
ON THE PLANET

THE SECOND TRANSITIONS ART-SCIENCE
FIELD PROGRAMME IN CANADA
AUGUST-SEPTEMBER 2019



The Transitions team (Gennadiy Ivanov, John Pomeroy, Trevor Davies) joined Global Water Futures colleagues undertaking research in the Canadian Rockies and Canadian Prairies-following the flow of the waters of the Saskatchewan River from their mountain headwaters across the semi-arid prairies. Some of the locations visited on the first research programme in April 2019 were revisited, most notably Peyto Glacier Research Basin and Fortress Mountain Research Basin in the Canadian Rockies. The paintings produced on the first trip, which also included Yukon and Northwest Territories, are published in the first Transitions magazine (<https://issuu.com/nsag/docs/transitions/s/140988>).

The reason to re-visit the mountain sites was for the artist to be able to capture and represent sensitive sites impacted by climate change at a time when maximum summer heat and lack of snowcover revealed active glacier melt and mountain permafrost thaw. In this way the full extent of the retreat and the state of the Peyto Glacier could be recorded. The paintings of Fortress Mountain in April had elicited such a strong response from viewers that the team felt it appropriate to capture its summer aspect. New sites in the Rockies were visited, including the Athabasca Glacier which is one of the most accessible of glaciers, visited by many tourists. Evidence of the impacts of severe flooding, the frequency of which is changing due to climate change, was photographed and painted. The road journey from the Rockies to the Prairies of Saskatchewan took in Drumheller, the "dinosaur capital of the world", which has a special story to tell about previous climate and environmental changes – and which provided a pertinent long-term context our modern-day challenge.





TRANSITIONS AND GLOBAL WATER FUTURES

Transitions is a Global Water Futures (GWF) interdisciplinary art-science project. The paintings, drawings, photographs and video of locations in Canada are due to the generous support of this Canada First Research Excellence Fund supported research programme. GWF is headquartered at the University of Saskatchewan in Saskatoon, Canada and directed by Professor John Pomeroy. It is a transdisciplinary, inter-institutional programme, in partnership with 17 other Canadian universities and hundreds of national and international partners. GWF supports the research of 167 Canadian academics through 45 projects and core teams. They have employed 500 students and researchers making GWF the largest university-based water science programme in the world. GWF's strategic aims are to demonstrate global leadership in water science in colder regions, and to address the needs of the national economy in adapting to change and managing the risks of uncertain water futures and extreme events. It is improving disaster management by increasing scientific knowledge, and developing observation and modelling technologies. This is directly related to the improvements it is making in forecasting capacity to predict the risk and severity of extreme events that are increasing due to climate change. A critical mission is to utilise all relevant data in order to make better decisions about our water futures, and to improve models in order to assess changes in climate, land and water systems – fully accounting for human/environment interactions. In these ways, GWF is helping to reduce the risk of water threats and improve the design of climate change adaptation strategies, to the benefit of the national economy. GWF is an important source of input to policy, governance and management of water issues in systems which are changing rapidly, much of it due to climate change. Throughout all these aims and activities runs the powerful theme of community engagement, including full engagement with the Indigenous communities in Canada that are so profoundly impacted by changing water security.



John Pomeroy with Greta Thunberg at the Athabasca Glacier.
Photograph: Mark Ferguson / GWF, USASK.CA

JOHN POMEROY

GENNADIY IVANOV

THE TRANSITIONS TEAM

TREVOR DAVIES



The Transitions team has strived to make the project as deeply-interdisciplinary as possible. Ivanov has learned something of the science behind climate change, and has joined scientists on routine research visits and measurement campaigns in Canada. He takes photographs and produces small pastel paintings in the field, often in discussion with the scientists as they go about their work, as he witnesses the techniques deployed in the field, or in conversations on the physical explanations of the features being painted. Pomeroy and Davies have started to appreciate the range of skills and techniques at Ivanov's disposal. They have learned how best to discuss Ivanov's portrayal of particular features, or which ones should be emphasised to illustrate the most salient physical characteristics. This two-way interaction is, perhaps, most rewarding when Ivanov produces his studio paintings – based on his recollections, photographs, and field paintings. Sometimes, there are several iterations as to the best combinations of representation and interpretation to hit the two buttons: of artistic impact; and scientific coherence and message.

The paintings Ivanov produced from the first field campaign in Alberta, Yukon, and Northwest Territories in April 2019 were so well received – by the public, artists, and scientists (both within and without the Global Waters Future research programme) – that, in December 2019, GWF and the University of Saskatchewan provided financial support for a two-year term as Artist-in-Residence.

A photograph of a mountain landscape. In the foreground, a large, rounded rock is covered in bright orange lichen. Three hikers are walking away from the camera on a dirt path. The background features a large, craggy mountain peak under a grey, overcast sky. The text "DRAWINGS PHOTOGRAPHS FIELD PAINTINGS STUDIO PAINTINGS" is overlaid in white, bold, sans-serif font in the upper center of the image.

**DRAWINGS
PHOTOGRAPHS
FIELD PAINTINGS
STUDIO PAINTINGS**

"In August 2019, I returned to Canada. This time to the Canadian Rockies in Alberta and British Columbia, and east into the Prairies - including Saskatchewan. I joined scientists to see the glaciers completely unobscured by seasonal snow-cover and at the height of the melt season. I also saw some of impacts of major hydrological events related to climate change in the Prairies." (Gennadiy Ivanov).



JOHNSON LAKE

The pastel field drawing



Johnson Lake is a 20 ha reservoir, at an elevation of 1,426m, near Banff in Alberta.

"I made a small field painting of this lake because I was struck, and depressed by the fact, that although - to my eyes - it looked pristine, there were recent notices warning that the lake's trout were suffering from an out-break of whirling disease." (Gennadiy Ivanov).

Whirling disease is caused by a myxosporean parasite which induces the fish to swim with a whirling motion. It was first observed in the USA, and has spread across international and provincial borders through recreational activities. Although not related to climate change, it was an example of the multitude of stresses which human activity can place on aquatic environments.

ATHABASCA GLACIER

The field pastel drawings



The Athabasca Glacier, which is an outflow glacier from the Columbia Icefield, is one of the 60 study sites where the Global Water Futures programme has installed automatic weather, snow and ice monitoring stations. The glacier has lost around half of its volume, and its snout has retreated by about 2 km, in the last 125 years. It is currently melting downward at 5 to 6m per year. In August 2019, the exposed ice surface was criss-crossed with crevasses, mill-holes or moulins, and deep melt-water channels - rivers of meltwater born on a dying glacier. The ice-surface had a reddish-purple hue - from red/purple algae; a component of a material called cryoconite.

ATHABASCA GLACIER

PASTEL PAINTINGS / SERIES





ATHABASCA GLACIER

OIL PAINTINGS / SERIES



BREAKFAST WITH SCIENTISTS

OIL ON CANVAS, 150X120 CM

A vital part of the Transitions climate-art project is discussion with the scientists, not only in the field but also in reflection. This conceptualisation of a breakfast conversation with Professor John Pomeroy (left) and Professor Trevor Davies occurred the morning after our exhausting day on the Peyto Glacier in August 2019. On the table is an accumulation of cryoconite; a strange material which consists of ash and soot from wildfires and air pollution, dust, bacteria, fungi, algae and other organisms. It collects on the surface of the glacier, and has been increasing over the years as greater more frequent and more extensive wildfires deposit more soot which feeds the algae and microbes, darkens the glacier and contributes to increasing melt rates. Summer melt washes some of it off the glacier surface, and it accumulates in weird formations below the snout of the glacier. Scientists from Global Water Futures are examining its composition by various techniques, including scanning electron microscopy and DNA sequencing and showing how it is accelerating glacier melt and ultimately sea level rise.



WORLDS WITHIN WORLDS

OIL ON ROUND CANVAS, 20 CM



"One of the most fascinating outcomes of conversations with scientists has been my growing realisation of how interconnected the world is and how something that is very small can affect the whole planet." (Gennadiy Ivanov).

The connection between the rate of melting of the ice and the "brightness" (the albedo, in scientific terms) of the ice surface. Clean ice is very bright and melts slowly and dark ice absorbs solar energy and melts more quickly. Rapid ice melt leads to sea level rise and deglaciation. This dark material is known as cryoconite, and is teeming with life, including pollen and living organisms such as algae and bacteria. Cryoconite accelerates glacier melt. It can be studied through the technique of scanning electron microscopy (SEM), which produces images at, typically, around 10,000 magnification. These World Within World paintings are based on SEM images of cryoconite samples from the Peyto Glacier - collected and analysed by Global Water Futures scientists. This normally unseen "microworld" has profound impacts on our Earth - the accelerated glacier melt caused by these microorganisms even contributes to the sea level rise that low-lying coastal regions such as East Anglia in the UK are experiencing.





AND FIRE IN HIS EYES

OIL ON CANVAS, 100X100 CM

"One thing which has really struck me about the scientists is how enthusiastic – indeed, passionate – they are about their research. They are fired-up about their work."

(Gennadiy Ivanov).

This painting shows John Pomeroy, who is discussing some important detail of the science, with Trevor Davies. Davies is the reflection; standing next to an automatic weather station on the Athabasca Glacier.

CRYOCONITE SEDIMENT I,II

OIL ON CANVAS.

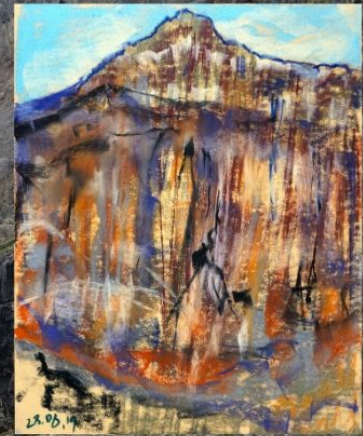
"They may have been discussing the deposits of cryoconite which accumulate on the surface of the glacier; in increasing quantities each year".

(Gennadiy Ivanov).



STANLEY GLACIER

THE FIELD PASTEL DRAWINGS



Stanley Glacier is in Kootenay National Park in British Columbia, just over the provincial border with Alberta and in the headwater of the Columbia River which supplies water for ecosystems, food and energy in vast areas of British Columbia and the US Pacific Northwest. Although not as intensively monitored as glaciers like Peyto of Athabasca it, too, is receding rapidly. On the trek up to a convenient vantage point to paint, there is still much remaining evidence of the Vermilion Pass forest fire which destroyed 2,500 hectares over 18 days in 1968 and subsequent fires in 2003 and 2018. Forests in these locations take a long time to recover. The ground squirrels were inquisitive.

VERMILION PASS FOREST FIRE

PASTEL DRAWINGS/ OIL PAINTINGS



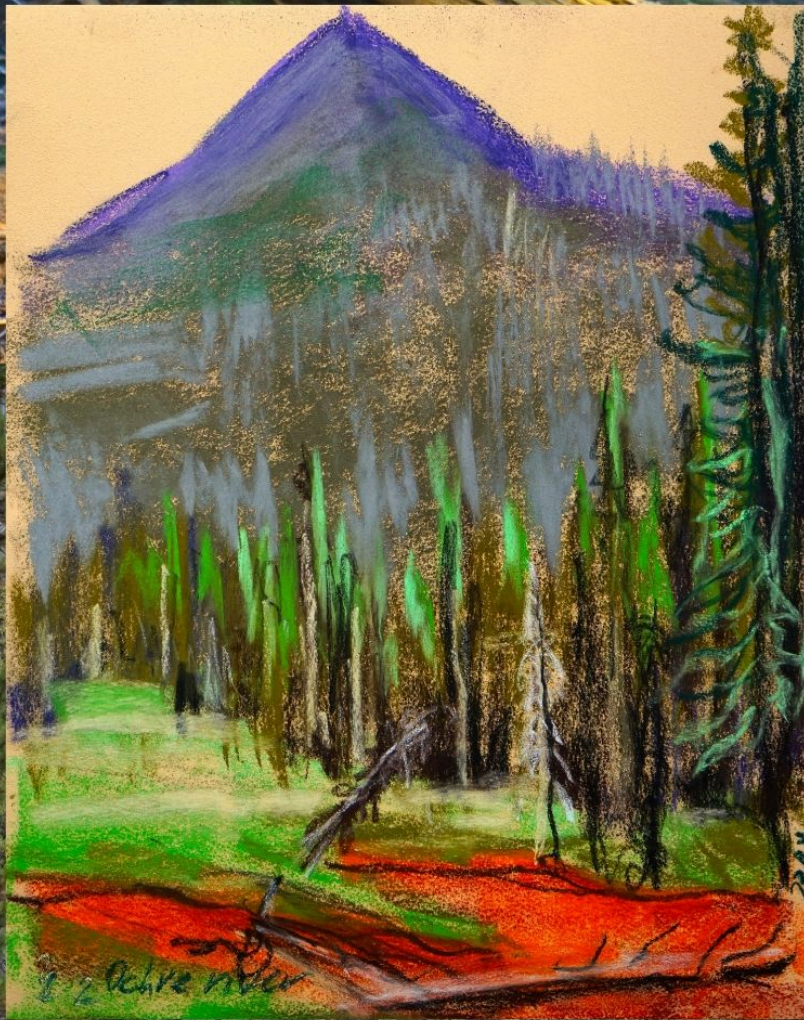
Not just inquisitive, The ground squirrels seemed to appreciate Ivanov's efforts.





VERMILION PASS FOREST FIRE

OIL PAINTINGS ON CANVAS, 80X80 CM



OCHRE RIVER

THE FIELD PASTEL DRAWING

Vermilion Pass gets its name from the colouration which originates in mineral springs of iron oxide. These ochre springs are important for the indigenous people, and are known as the paint pots. Scientifically, it is an interesting location because of the pronounced influence of groundwater chemistry on surface waters. "This felt a special - and elemental - place to me. The paint pots and the stream-water downstream were amongst the most vivid colourations I have seen in nature". (Gennadiy Ivanov).

COUGAR CREEK DEBRIS NET

THE FIELD PASTEL DRAWING



On June 20 2013, the town of Canmore, Alberta and much of the surrounding region experienced a devastating flood that was the most expensive natural disaster in Canadian history at that time. The torrent formed a debris flow that tore down Cougar Creek destroying homes, railways and roads, causing substantial damage and isolating the region for several days. The flood was caused by three days of heavy rainfall forming runoff over still frozen alpine soils and enhanced by melt of a late lying alpine snowpack. It was exceptional event in modern Canmore, but similar events were noted in the late 19th and early 20th C. In anticipation of the increased frequency and magnitude that is likely for future extreme rainfalls, a temporary debris net was constructed above the town after the 2013 flood to retain boulders and trees within the torrent. A retaining dam is planned for future. The University of Saskatchewan's Coldwater Laboratory is based in Canmore, researching climate and hydrological regime changes and has developed predictive models for events such as this.



MARMOT CREEK RESEARCH BASIN, AB

OIL ON CANVAS PAINTING



Marmot Creek Research Basin was established by Federal and Provincial Governments in 1962, but closed down in 1987. It was reactivated by the University of Saskatchewan and Environment Canada in 2004. Despite the 17-year hiatus, the measurements have supported 130 research publications in hydrological processes and modelling and provides a valuable baseline by which to assess climate change. One of the founders of Marmot Creek Research Basin, Jim Bruce, went on to found the Canada Centre for Inland Waters, and the Intergovernmental Panel on Climate Change (IPCC). He was recognised for this along with other IPCC members and was on stage to receive the Nobel Prize in Stockholm, Sweden. Long-term monitoring programmes are vital for studies on climate change and its impacts. On this occasion the Transitions team was accompanied by a pioneering researcher in snow chemistry and ecology; Professor Gerry Jones, who did most of his research at the Université du Québec, guided Marmot Creek's snow chemistry studies.

FORTRESS MOUNTAIN, KANANASKIS, ALBERTA

DRAWINGS AND PAINTINGS

Fortress Mountain Research Basin is where GWF scientists are discovering the fundamental processes that govern the interaction between climate, high mountains, snow, ecosystems and streamflow generation. It shows that mountain hydrology can be sensitive to climate change and that ecosystem processes mediate this response to cause a very different future ability of mountain catchments to generate source waters.



FORTRESS MOUNTAIN

OIL ON CANVAS,
150X100 CM

26.08
Fortress ridge



THE STATIONS OF FORTRESS MOUNTAIN
RESEARCH BASIN

THE FIELD PASTEL DRAWING



"The paintings I produced of the Fortress Mountain Research Basin, during and after the Transitions visit in March-April, when snow blanketed the flatter surfaces and an icy gale was blowing, were - viewers told me - amongst the most dramatic of my paintings. The landscape is dramatic. I wanted to capture its very different demeanour in summer. To my astonishment, rather than wind-hardened snow, the land around the automatic weather station closest to the dramatic peak had a green alpine meadow appearance. Just a kilometre away, and a little lower, another weather station was surrounded by shrubs and small trees. I painted Fortress Mountain at the end of summer but, already, I could sense its return to icy winter wilderness".
(Gennadiy Ivanov).



END OF THE SUMMER BY FORTRESS MOUNTAIN

PASTEL DRAWINGS AND OIL PAINTINGS








RECEDING GLACIER

OIL ON CANVAS PAINTING
60X80 CM

An impressionistic painting inspired by spectacular views seen of the Athabasca, Peyto, and Stanley Glaciers.



PEYTO GLACIER



The Peyto Glacier in the Rockies of Alberta is one of the world's longest-studied glaciers. It has lost more than 70% of its volume since the beginning of the 20th Century, with recession being particularly rapid in recent decades. Measurement stations erected on the ice have been lost because of the great rates of melting. The Transitions team visited the glacier in April 2019 and, because the detailed and extensive scientific studies of it are so important, decided to return the following August when its shrinking form is more evident without winter snow-cover.

A brilliant summer's day meant that the field paintings were amongst the most colourful that Ivanov has produced of a glacier. "Despite the bright colours, the bare moraines and sediments left by the retreating ice gave me a sense of destruction, darkness and decay borne in rapid deglaciation initiated by human-caused climate change". (Gennadiy Ivanov).

The following pages show the artist's attempts to capture - on this one bright day in summer - the criss-cross patterns of crevasses and melt channels, the collapsing of the ice mass, and the strange, barren deposited material left by the receding glacier. The Transitions team agreed it was a disturbing task to try to represent the sense of decay during an azure day which produced vivid contrasts and colourations.

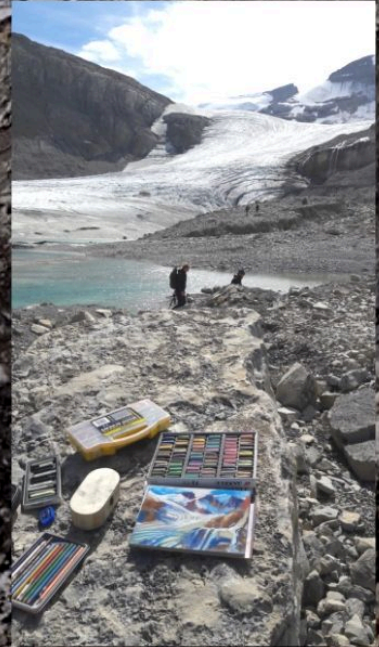
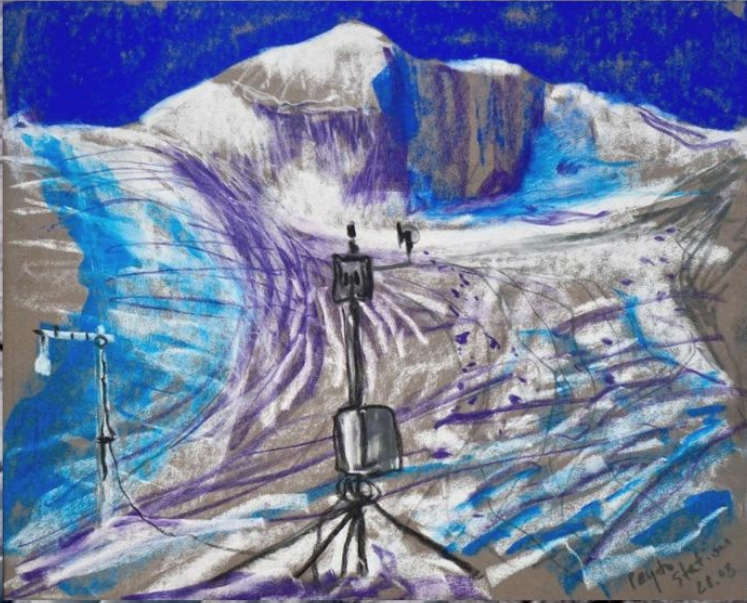


The rapidly retreating Peyto Glacier reveals a former sub-glacial channel that is emerging as a large stream beside the glacier. The stream is fed from melting ice and snow and is choked with ice that has collapsed from tunnel walls within the glacier and now will flow with the river to melt downstream. The cold water from these streams provides ideal conditions for native trout in the Canadian Rockies. This cold water has become even more important as recent hot summers have warmed river temperatures above the cool conditions that trout require. Glacial meltwater can also be an important water supply to support river flows to the Canadian Prairies and British Columbia in years of drought.

BIRTH OF THE RIVER, DEATH OF THE GLACIER

THE FIELD DRAWINGS AND PAINTING





THE FIELD PASTEL DRAWINGS

PASTEL ON PAPER





THE GLACIER ICE AND WATER

OIL ON CANVAS, 80X80 CM

Distributed amongst the terminal moraines, just below the glacier snout, are the strange black accumulations of cryoconite, some of which resemble mountain ranges in miniature form, 1-2m in height.

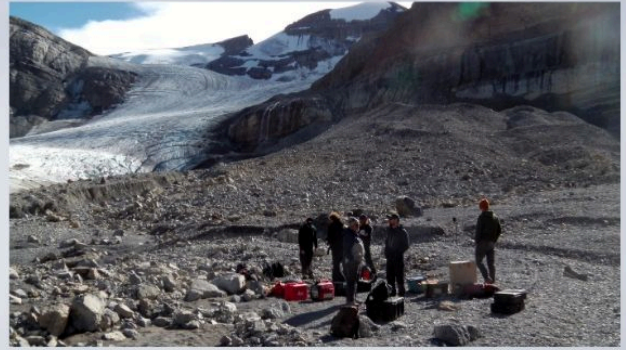
The view down the glaciated U-shaped valley, from a point beneath the present glacier snout, gives a very clear impression of the scale of Peyto in recent decades.



THE FIELD PASTEL DRAWINGS

OIL PAINTING , PASTEL ON PAPER





PEYTO GLACIER PASTEL DRAWING

PASTEL ON PAPER





THE PEYTO GLACIER FIELD PHOTOGRAPHS



PEYTO GLACIER SMALL OIL PAINTINGS

OIL ON CANVAS/BOARD

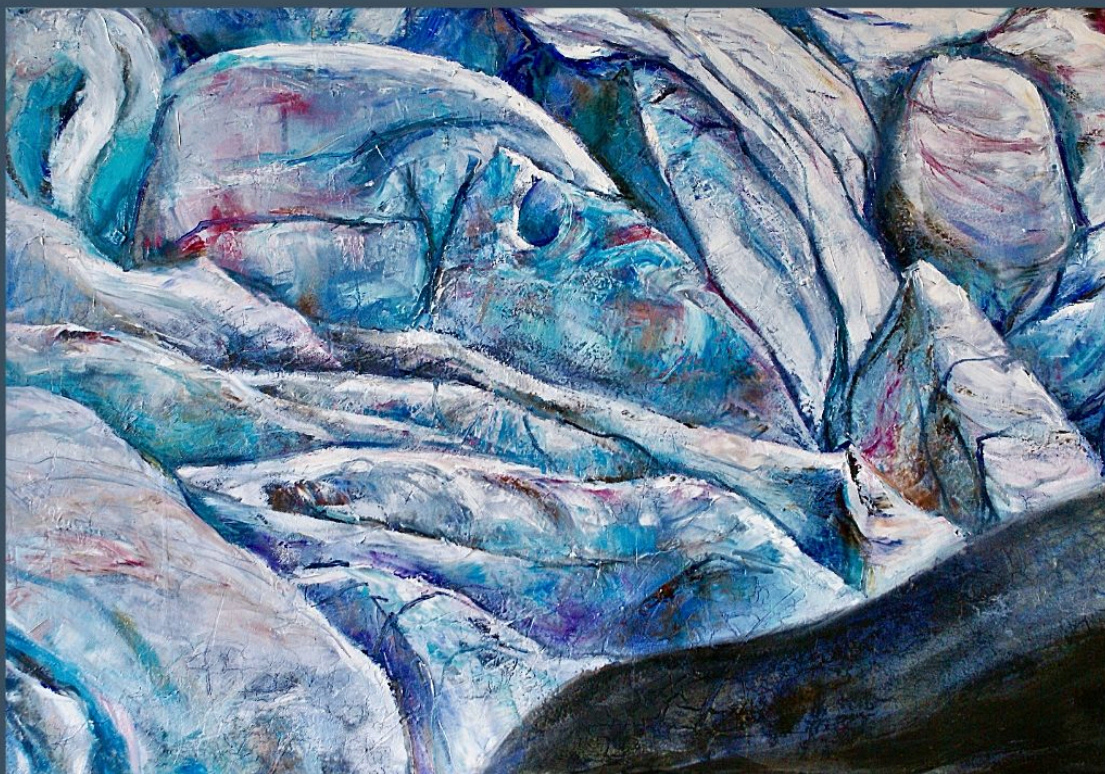




PEYTO CREVASSES

OIL PAINTINGS, 91X116 CM





PEYTO CREVASSES

OIL PAINTING (TOP) & PASTEL DRAWING





“I wonder what Peyto will look like next year? Or next decade? Or the start of next century; or if it will be there?”
(Gennadiy Ivanov).



DRUMHELLER CANYON AND COLOURFUL EARTH LAYERS THESE ARE THE BADLANDS OF ALBERTA

THE PASTEL DRAWING

The Prairies east of Calgary in summer are vast rolling fields of canola and wheat. The vast underlying oil and gas reserves are evidenced by storage tanks dotted across the landscape, looking like shiny buttons in the vast landscape. Occasionally, long trains transporting the fossil fuel traverse the landscape. This is also old coal country; settlements – with names like Carbon – whose original purpose was coal-mining; but no more. And then, on the sedate journey eastwards – a dramatic 130m deep scar cutting through the rolling landscape. The canyon was cut by the Red Deer River during the catastrophic flooding that accompanied deglaciation around 10,000 years ago. The river cut a deep channel into the layers of ancient ocean and swamp sediments deposited along with carbon – which later formed into coal – during the Cretaceous Period around 70-75 million years ago. The horizontal rock bands are of distinctly contrasting colours of textures. Some of these layers have provided one of the richest sources of dinosaur fossils in the world. The town which sits on the floor of the canyon – Drumheller, originally a coal mining town – is justifiably proud of its moniker: Dinosaur Capital of the World.





LAST CHANCE

OIL PAINTING, 120X150 CM



Rosedeer, in the Alberta Badlands, was once a thriving coal-mining town. Now, few people live here. The name of the saloon at the hotel seemed apposite. Time is running out to make the necessary sharp reductions in carbon emissions to avoid the very worst consequences of climate change. On the other side of the disused railway track from the Last Chance Saloon was a dead tree festooned with dolls and toys. "Somehow, to me, this summed up the starkness of the choices facing us; or rather, to which we have to face up". (Gennadiy Ivanov).



THE DINOSAUR'S DAMNATION

OIL PAINTING, 120X150 CM

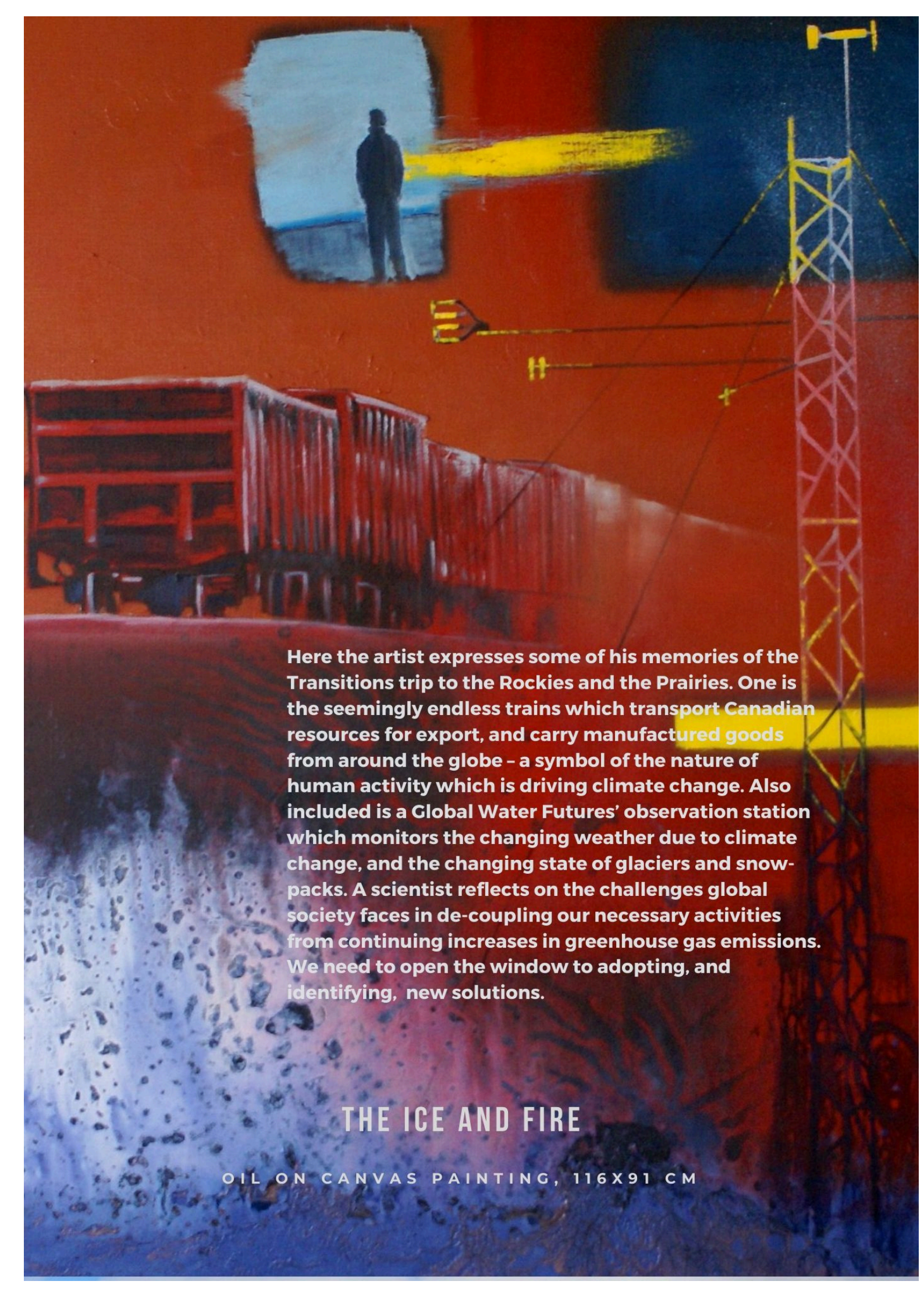
The artist has taken the opportunity to juxtapose a dinosaur, the fossil- and coal-bearing strata, and a modern Alberta oil extraction facility. Many indigenous peoples in North America have a mythology about a horned serpent, with the mystical beast associated with extreme events – rain, water, thunder, lightning. “Many of the fabulous fossils in the Tyrell Museum just outside Drumheller evoked a horned serpent in my mind”, (Gennadiy Ivanov). The dinosaur is watching, atop the beds overlaying the fossil-rich strata, as humankind is instigating a global environmental change which may well appear in Earth’s future geological record- and already dubbed the Anthropocene.



SENTINELS FROM ANCIENT SEAS

OIL PAINTING, 120X150 CM

Hoodoos – these strange formations – have become a symbol of Alberta’s Badlands. They are composed of erodible sand and clay deposited during the Cretaceous which, originally, was covered by a harder, more resistant layer. The sedimentary layers became exposed following the catastrophic flooding that accompanied deglaciation in the Prairies. As erosion from snowmelt and rainfall proceeded, the harder rock provided some protection to the softer underlying layers. The harder capstones remain today in this strange landscape of rock mushrooms. These sentinels are eroding rapidly today, on watch over the landscape which contained, and still contains, so much fossil carbon. Wear and tear from tourists, which flock to see them, have caused additional erosion to many of the finest specimens. Visitor access to some of the sentinels is now restricted, but erosion is proceeding apace due to heavier and more frequent summer rainfalls due to climate change.



Here the artist expresses some of his memories of the Transitions trip to the Rockies and the Prairies. One is the seemingly endless trains which transport Canadian resources for export, and carry manufactured goods from around the globe - a symbol of the nature of human activity which is driving climate change. Also included is a Global Water Futures' observation station which monitors the changing weather due to climate change, and the changing state of glaciers and snow-packs. A scientist reflects on the challenges global society faces in de-coupling our necessary activities from continuing increases in greenhouse gas emissions. We need to open the window to adopting, and identifying, new solutions.

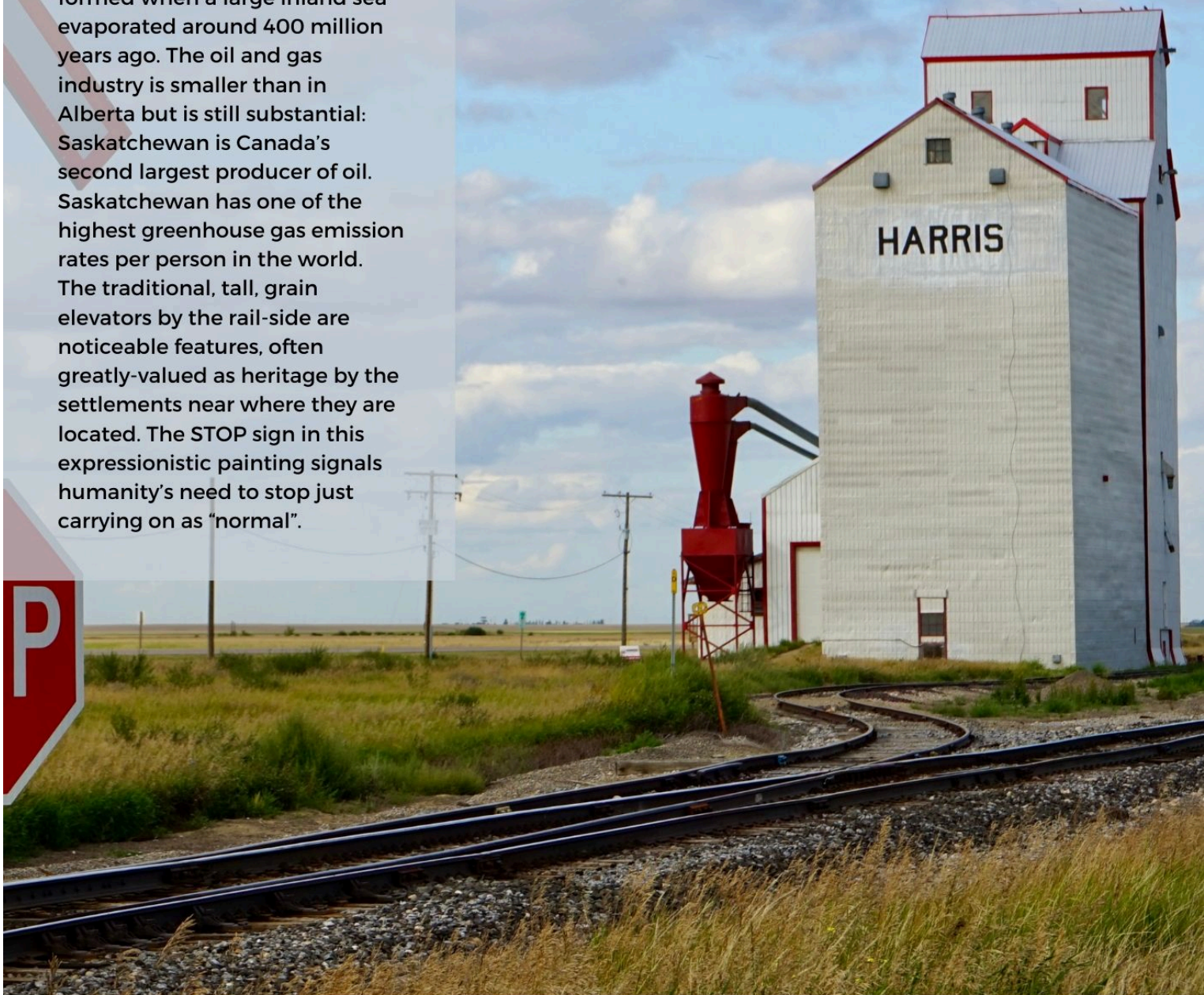
THE ICE AND FIRE

OIL ON CANVAS PAINTING, 116X91 CM

SASKATCHEWAN PRAIRIES

PASTEL DRAWING

As the Transitions team travelled eastwards from Drumheller, over the Alberta - Saskatchewan border, on the way to Saskatoon where the Global Water Futures research programme has its headquarters at the University of Saskatchewan, the railways became an increasingly obvious feature in the landscape. They are used to transport Prairie wheat, oilseeds, pulse crops, potash and oil. Saskatchewan has the world's largest potash reserves, with many of the mines near Saskatoon. The resource formed when a large inland sea evaporated around 400 million years ago. The oil and gas industry is smaller than in Alberta but is still substantial: Saskatchewan is Canada's second largest producer of oil. Saskatchewan has one of the highest greenhouse gas emission rates per person in the world. The traditional, tall, grain elevators by the rail-side are noticeable features, often greatly-valued as heritage by the settlements near where they are located. The STOP sign in this expressionistic painting signals humanity's need to stop just carrying on as "normal".



CLAVET RESEARCH FARM, SASKATCHEWAN



THE FIELD PASTEL DRAWING



Just outside Saskatoon is a Global Water Futures experimental set-up at the Clavet Research Farm-part of a livestock and forage research centre. Ground-based instrumentation and drone-borne sensors help scientists understand, and model, hydrological processes. Besides contributing to more effective agricultural practices - important as climate change leads to changing weather patterns - the data are important for modelling exchanges between crops and atmosphere.



THE SALT LAKE

OIL PAINTING, 80 X 80 CM



Near Clavet Research Farm the changing patterns of flood, salinization and drought have led to the evaporation of a shallow lake, leaving salt deposits. In the distance are hay bales and a traditional grain elevator. "I have used this scene to produce another expressionistic painting. I have supplemented the hay bales with stacks of oil pipe sections, which are a common sight across the Prairies. I have also introduced a coal power station. Around one-third of Saskatchewan's power comes from coal-burning." (Gennadiy Ivanov).

NORTH EAST SWALE

THE FIELD PASTEL DRAWING



North East Swale is on the edge of Saskatoon. It is regarded as a unique environment, which has natural and cultural connections to Saskatchewan's past. It is a habitat for more than 200 plants species, more than 100 birds, and many mammals, reptiles, insects and amphibians. It harbours some of the last Plains Rough Fescue in the world. Its wetlands store runoff from the rapidly growing immediately-adjacent urban neighbourhood. Consequently, its successful management is challenging. It is an important field training attribute for students at the University of Saskatchewan. Here they start to understand the rigorous science methods which are required to understand the complex human-environment linkages which are needed for successful management of valuable environmental resources. This field pastel shows new housing development in the distance; and behind it an approaching storm. There are dead patches in the vegetation cover - a consequence of pronounced fluctuations in water levels due to recent drought and previous flooding-extremes that are magnified because of climate change.





THE END OF THE ENDLESS OIL TRAIN

OIL PAINTING, 90X90 CM

The oil trains traversing the Canadian Prairies seemed endless. Eventually they did end. Is this painting prophetic?

Transporting oil this way presents risks from spills and contamination. Two recent derailments in two months near Guernsey, 115 km south-east of Saskatoon, led to spills of 1.5 and 1.6 million litres of oil. These incidents can be catastrophic; the derailment of a train carrying oil from Saskatchewan in 2013 caused an explosion and the deaths of 47 people in Lac Mégantic, Québec.

FIRE; AND ANOTHER EXPRESSION OF THE NUCLEAR EXPLOSION IN SLOW MOTION

OIL PAINTING, 90X90 CM



Fire has been a recurring theme of the Transition's team experience: more frequent wild fires – forest and grassland; relayed accounts of the fires in the oil train derailments in Saskatchewan, on top of the terrible death toll in the Lac Mégantic oil train explosion a few years ago.

“This painting is based on a bonfire I saw near Saskatoon. It brought to mind the words of the Gwich'in Chief in northern Canada when describing the impacts of climate change on his people's landscape – like watching a nuclear explosion in slow motion.” (Gennadiy Ivanov).



THE HOT SUNSET IN THE ARCTIC

OIL PAINTING, 80X80 CM

“This, in turn, took my mind back to the March-April 2019 trip to Yukon and Northwest Territories”.

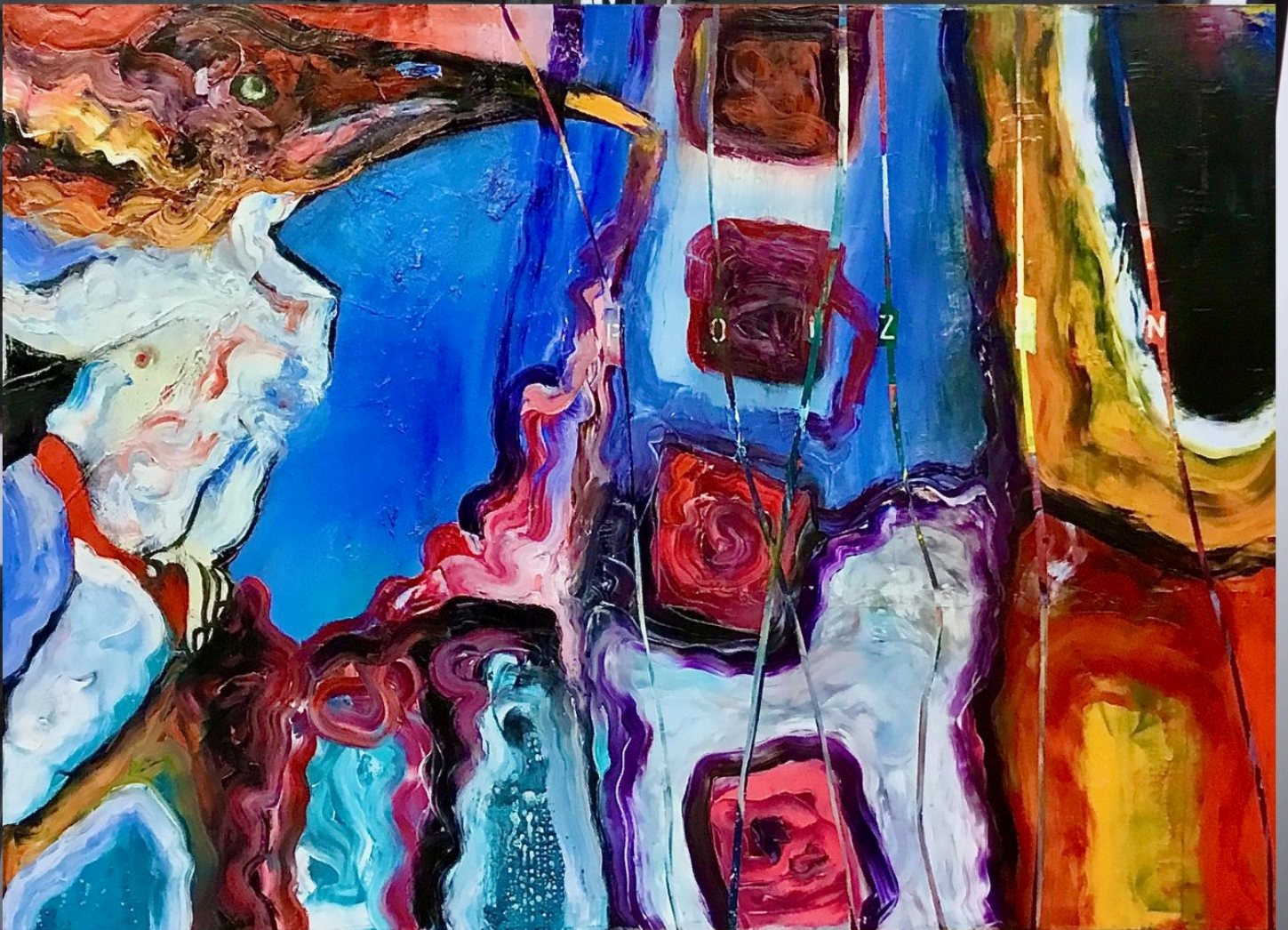
CARBON AND WATER EXCHANGES IN PLANTED FORESTS STATION, ON PHOTOGRAPH

Here the artist has used separate elements of fire, disaggregated to mirror the lattice structure of a Global Water Futures tower for observing carbon and water fluxes. He has included water, snow and ice elements. There is also the head of a bird. The raven is important for many indigenous Canadian peoples, although the symbolism is complex. When it talks it can represent prophecy and insight, but also deceit and trickery.

"I think of the scientists pursuing truth, and those who seek to deny it." (Gennadiy Ivanov)

THE TASTE OF FIRE

OIL ON CANVAS, 83X113 CM





THE NORTHERN CANADIAN LANDSCAPE

OIL ON CANVAS, 90X60 CM

THE NORTHERN APPLE

OIL PAINTING, 200X150CM



"This painting expresses some of my emotions when talking in a light-hearted way of apple orchards in Northwest Territories. Here the apple is growing on an automatic weather station. The animals will have to adapt, or not, to major climate shifts. The scientists do their best to explain". (Gennadiy Ivanov).



Hundreds of miles to the east, some of the meltwater from the Canadian Rockies flows through the Canadian Prairies in the South Saskatchewan River. The streamflow regimes in the Canadian Prairies are also changing because of climate change and human use for irrigation and hydroelectric power. Pronounced floods and droughts (which are leading to earlier and more frequent vegetation fires) are increasing in frequency and intensity, with implications for agriculture, infrastructure and transport. The worst floods and droughts since colonisation of the region in the late 1800s have occurred in the last two decades. The South Saskatchewan River flows through the city of Saskatoon, the home of the University of Saskatchewan and the headquarters of the Global Water Futures research programme. The slumping banks of the river, and the changing pattern of sand bars, show evidence of shifting patterns of erosion and deposition in response to recent hydrological changes. The best way of seeing this evidence is from a canoe, and this series of pastels illustrates the changing views - very different from the sculpted landscapes of the Rockies - painted on a 12km sojourn on the river, downstream towards Saskatoon, under the paddle power of the scientists!



THE AUTUMN FEELINGS, SOUTH SASKATCHEWAN RIVER

OIL PAINTING, 80 X 80 CM



SHORT SOJOURN ON THE SOUTH SASKATCHEWAN

THE FIELD PASTEL DRAWING
WATERCOLOURS PAINTINGS





SMART WATER SYSTEMS LABORATORY

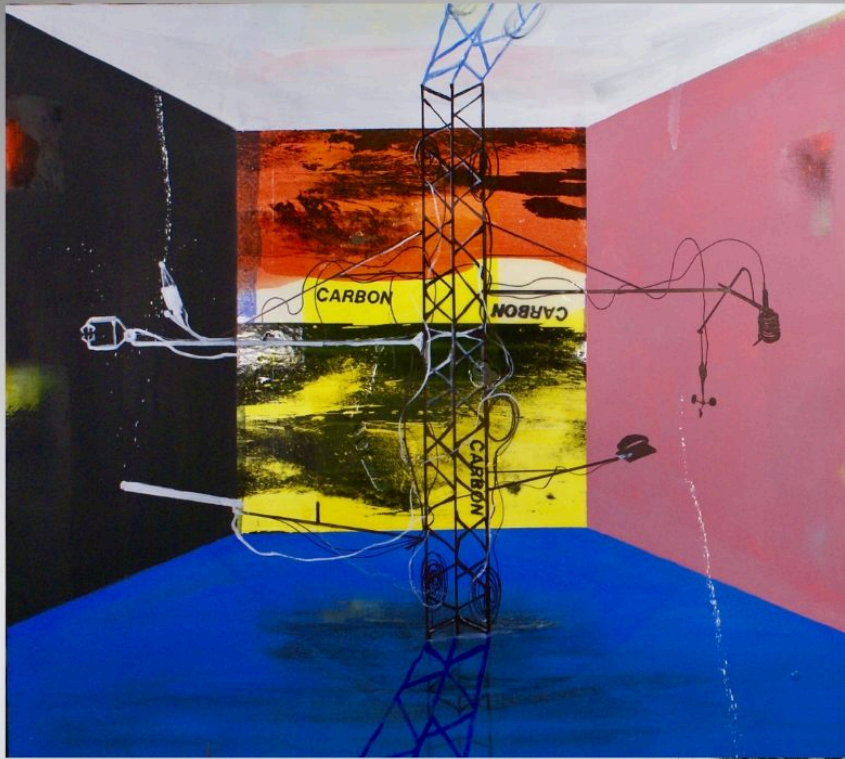


GLOBAL WATER FUTURES



UNIVERSITY OF SASKATCHEWAN
Global Institute for
Water Security





DENIERS' STATION

OIL ON CANVAS, 90X91 CM

This painting was inspired by a visit to a McMaster University research station in a White Pine forest in southern Ontario. This was on the occasion of a Transitions exhibition of paintings at a Global Water Futures scientific meeting in Hamilton. The instruments record meteorological variables including water vapour flux, and carbon dioxide exchange. "I have inverted some of the instruments. This represents, to me, the way in which some turn logic upside-down" (Gennadiy Ivanov).



LISTEN TO THE SCIENTISTS

OIL ON CANVAS, 200X140 CM

Prof John Pomeroy explaining some of Global Water Futures research on the Athabasca Glacier to Greta Thunberg in autumn 2019.

A message Ms Thunberg often gives is: listen to the scientists.

"The substantial change that loss of snow-packs and glaciers is having on the planet is something the international scientific and policy community needs to address quite urgently. These changes have led to, and will continue to cause, serious unsustainability of freshwater as a result of the impact of climate change".

(John Pomeroy, World Meteorological Organization's High Mountain Summit, Geneva, October 2019).



SNOWY MOUNTAINS

OIL ON CANVAS, 76X50 CM



THE MOUNTAINS & GLACIERS SERIES

OIL ON CANVAS



PART OF THE 'METAMORPHOSIS' EXHIBITION

NORWICH, THE UNDERCROFT GALLERY,
OCTOBER 2019





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GLOBAL WATER FUTURES RESEARCH PROGRAMME

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