

In the Fall of 1995 the local weekly newspaper of the Westmeath Peninsula "*The Cobden Sun*" covered the cave dives of Dr. David Sawatzky and diving partner Ric Browning, as they explored the system of underwater caves in the Paquette Rapids area of the Ottawa River's channel, north of the Village of Westmeath, ON. At the time, studies were underway by the then Ministry of the Environment and Energy, to choose candidate areas for the location of landfill dumps. Editor Marie Zettler's editorial that week was entitled "*Ludicrous*", as indeed it was to contemplate locating a dump over the permeable limestone bedrock of the Peninsula.

## NEWS

# Will there be a garbage dump above the *lost snye*?

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### *Still waters that run deep?*

Bill Hennessy, a Westmeath Township resident, stands besides an unassuming looking pond between the Ottawa River and the river road at Westmeath. The pond is actually part of an underwater cave network, of which divers have explored six kilometres over the past 10 years, said to be the largest known network of caves in Ontario. This pond, 18 to 20 feet wide and about 12 feet deep, resulted when the roof of a cave collapsed. It's size is indicative of the subterranean passages which undermine parts of the area. For story, see Pages 2 and 3.

By Marie Zettler  
Sun Editor

The mists of time swirl around the legends and lore of the Ottawa Valley. Stories of the hardships faced by pioneers that we're glad to relegate to the past. Tales of the heyday of the lumber industry that passed away far too soon.

As time goes by, it becomes more difficult to separate fact from fiction. Even Joe Mufferaw, the Ottawa Valley's version of Paul Bunyan, was real. Unquestionably, some of his exploits immortalized in story and song are not.

Tales of underground rivers flowing through that part of Westmeath Township surrounded on three sides by the Ottawa River fall into that misty area where legend and reality meet. Old lumbermen talk of the *lost snye*.

A *snye*, in loggers' terms, is a secondary channel of a stream. The *lost snye* referred to a presumed passageway into which marked logs supposedly escaped from booms on the west side of the peninsula formed by the big bend in the Ottawa River, only to re-surface many miles downstream on the opposite side of the peninsula.

Then there's the matter of sinkholes -- depressions in the ground, some dry, some filled with water.

There are a number of these at varying distances from the river, ranging from perhaps 30 or 40 to a couple of hundred feet from the shore of the Ottawa River along the western side of the peninsula, at the Paquette Rapids. The old-timers figured out a long time ago that these are connected with the river. There are stories of people swimming in these and being sucked down by the current only to have their corpses re-appear, like the logs, somewhere downstream in the Ottawa River.

It would be as difficult to track those stories to their sources at this point in history as it would be to nail Joe Mufferaw neatly into reality's box.

But it's a lot easier to document many of the remarkable present-day realities people experience in and around this area.

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### **Bawling calf in hole where ground collapsed**

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the aforementioned peninsula, where the water-filled sinkholes are located. And there's a strip of candidate land running right across the farms which have experienced groundhog problems (alleged) and sinking machinery problems (real).

Amid the general dismay generated by the PAWMB announcements, some startling facts have emerged.

"It is evident that limestone bedding exists over a large portion of the northern part of the township," says Bill Hennessy, a township landowner who is also a prospector and a serious amateur geologist. "This is shown by the bedding cut by the river at the Paquette Rapids, the limestone bedding cut by the River Road, and large limestone blocks present in fields caused by uplifting after the last ice age."

How do we know that these limestone boulders emerged after they were released from the weight of ice and later of water, and weren't carried there by a glacier?

"Stones or pebbles that have been moved quite a bit by ice are rounded," said Mr. Hennessy. "If they're irregularly shaped, as these are, they've come up."

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### **The area's bedrock is full of cracks**

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So what's the significance of this as related to a potential landfill site? Geologists tell us the area's bedrock is full of cracks.

"Limestone under a little pressure splits, and water gets through," said Mr. Hennessy. "Water gets into the cracks, and the freeze-thaw cycle causes more cracking. That's why we have a cracked rock system here."

Because the rocks at the surface haven't been moved there above ground, we can be reasonably sure that what exists below the surface is simply more of what we see at the rock cuts -- cracked layers of limestone.

Mr. Hennessy says well-drilling records back up his conclusions. So do the findings of Dr. Steve Worthington, a researcher with the Department of Geography at McMaster University in Hamilton. Dr. Worthington, who has

the limestone bedrock, which was already cracked and which has a tendency to dissolve.

In the early 80's, Dr. David Sawatzky, a medical doctor with the Canadian Forces, was posted to Base Petawawa. He began taking open water diving training from Al Shamesh, a well-known diving instructor and outfitter.

Mr. Shamesh was intrigued to hear about another of Dr. Sawatzky's recreational pursuits, dry caving. He had been talking to some open water divers who told him about diving in a cave along the bank of the Ottawa River. He also heard about about pools along the edge of the Ottawa River with water running through them.

"In June of 1984, Al visited the site for the first time, and was amazed to find several pools with the water boiling and swirling around like giant cauldrons," said Dr. Sawatzky. "He returned with two of his junior instructors and started diving."

As the team's explorations continued during the summer, they realized that they were into a large, complex cave system.

Meanwhile, Dr. Sawatzky had moved to Halifax. He continued open water diving and progressed to cave diving. He also furthered his medical education to become a military diving medicine specialist.

In 1986, Dr. Sawatzky was posted to CFB Toronto. He and Mr. Shamesh went to Florida to become certified as cave divers in the Cave Diving Section of the National Speleological Society.

Dr. Sawatzky continues to lead a team of divers in exploring and surveying the cave system.

"But the diving conditions in the Ottawa River system are very different than in the springs in Florida," says Dr. Sawatzky. "We were still forced to develop our own methods and technology."

Every dive must start either from a pool or from a sink or resurgence (inflow or outflow) in the riverbed.

"An exploration line is tied off securely, and the diver swims upstream into the cave," says Dr. Sawatzky. "Visibility is never more than five meters, even with a 75-watt light, brighter than a car head-



Those who have studied the geology of the Westmeath area say the condition of this limestone in a rock cut along the River Road is indicative of the type of bedrock found in candidate areas proposed for a landfill site.

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Ric Browning checks over an adjustment on Dr. Dave Sawatzky's diving suit as the two prepare for another trip into the cave network under part of Westmeath Township in Ontario, the Ottawa River itself, and Reid, Fitzpatrick, and Allumette Islands in Quebec. The existence of the caves has been known by divers for just over 10 years, but they've kept it quiet because it's so dangerous for divers inexperienced in cave diving.

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## **Bawling calf in hole where ground collapsed**

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One farmer tells of going to his field to check on a bawling cow. He found her calf in a hole about three feet deep where the ground had collapsed.

Three farmers on adjoining properties in the LaPasse area have, in recent years, had the shocking experience of having the ground give way under their farm machinery as they worked their field and suddenly finding their equipment.

"The tractor just dropped," said John Bertrand of his experience about 18 months ago. "It was down far enough it was all I could do to get out without getting stuck."

When he walked back to investigate, he saw what looked to be holes or tunnels heading in different directions.

A fourth neighbour suspects that "groundhog tunnels" that he has valiantly been trying to keep filled in for several years are, in fact, part of an underground cave network indicated by the collapsing earth on his neighbours' property.

Then there are areas of springtime ponding, where meltwaters form small lakes which disappear suddenly. This suggests that, once the ground frost thaws, the water drains away quickly into an underground passageway.

The stories of these "isolated" incidents and re-told legends surface from time to time in the general store, the coffee shop, and with the group that lingers after church on Sundays.

But recent events have made it imperative to pull them all together. The Pembroke and Area Waste Management Board (PAWMB) has designated 2,000 acres of land in Renfrew County as candidate areas for a new landfill site to serve Pembroke, Petawawa, Stafford, and surrounding areas. Much of this land is in Westmeath Township. There are large areas along the western perimeter of

of Dr. Steve Worthington, a researcher with the Department of Geography at McMaster University in Hamilton. Dr. Worthington, who has Masters and Doctoral degrees on water flow in limestone, says solution of the bedrock, a condition known as *karst*, is taking place. Karst makes flow paths in the limestone difficult to predict, results in rapid velocities, and provides minimal potential for attenuation -- or breaking down -- of leachate.

"These factors make limestone far from ideal in siting a landfill," he says.

Westmeath is one of the areas in which Dr. Worthington has been researching groundwater flow through limestone bedrock, and he has been doing this there for three years. But last month his work took him to Turkey. While there he used examples from his Westmeath Township findings in academic presentations.

If the cracked condition of the bedrock and its tendency to dissolve weren't enough to scare off any potential landfill-siter, there's more. Much more.

The old-timers were right. There are caves, both on land and under the river bed itself. That's what attracted Dr. Worthington to Westmeath in the first place.

"The area has the greatest concentration of caves in Ontario," he says.

The formation of caves is an interesting process. Water seeks the path of least resistance, and no one knows why the Ottawa River chose an almost S-shaped path between the city of Pembroke and the Chenaux Dam. Mr. Hennessy speculates that, at one time, what is now Muskrat Lake may have been a channel of the river, if not *the* main channel.

What is known is that the huge volume of water carried by the Ottawa drops over 250 feet between those two points. That's approaching twice the height of Niagara Falls.

It's not surprising, therefore, that some of the water would seek shortcuts through

swims upstream into the cave," says Dr. Sawatzky. "Visibility is never more than five meters, even with a 75-watt light, brighter than a car headlight."

The diver explores upstream whenever possible -- for two very good reasons. In the first place, the silt he or she inevitably kicks up is swept away, leaving the best possible visibility ahead. The downside is that visibility is almost nil going out. But the current assists his or her exit.

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## **Zero visibility when working downstream**

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"If the diver explores downstream, not only is he groping around in zero visibility, but the current pushes him into the cave and he has no way to estimate how much air he will use on the return trip, assuming that he can even swim against the current," says Dr. Sawatzky.

As the diver swims through the cave, he lays a thin exploration line off a dive reel to mark the way back.

Sounds simple. But if there is a large turn in the passageway, the diver will assume he has gone in a straight line because he's always swimming straight into the current, says Dr. Sawatzky.

When the diver decides to turn back, he ties the end of the line off -- Dr. Sawatzky says you can always find rocks or undissolved rock spikes that will serve this purpose -- cut the reel free, and follow the line back -- in near zero visibility. But if the passage has turned, the line will be pulled into the side of the passage. Because the passages tend to be horizontally elliptical, the line can work its way into the narrow edge of the ellipse, where the diver cannot go.

"The answer is to tie the line off frequently while going into the cave and to turn around when there's still lots of air," says Dr. Sawatzky.

**See Page 3**

# The lost snye

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After the exploration line is laid, it's replaced with heavier, more permanent line, run down the middle of the passage and securely fastened.

The exploration line must be removed at the same time or soon thereafter, to prevent confusion and/or entanglement during subsequent dives.

Now the actual survey can begin. A compass and tape measure are used, just as in dry caving. But that's where the similarity ends. In the limited visibility of the underwater cave, the survey team often has no idea where the walls of the passage are.

The line survey is plotted to scale on an underwater slate. Using slates made of pieces of white plastic roughened by sanding, notations are made with ordinary lead pencil. The pencil will not wash or rub off, but can be easily cleaned with an eraser -- after the data has been noted or perhaps photocopied.

nals the diver on the line to move to the next know and proceeds up the wall until the diver on the line signals him that he is perpendicular to the line once more.

"This system works very well and is surprisingly fast if the passage is fairly straight and the divers are well-trained," says Dr. Sawatzky. "Unfortunately, it becomes more complex and much slower when side passages are encountered, the mainline makes a sharp change of direction, or the side wall is more than 10 meters from the mainline."

Underwater hand-held sonar has been used to survey some caves. This works well when there is little silt, giving clear visibility, and when there are true walls. This is not the case in the Ottawa River caves.

Dr. Sawatzky's present diving partner is Ric Browning, 42, of Stoney Creek. Together they have spent about 150 hours cave diving in the Ottawa River system.

when he came out, he waited. After a while he went back in, and found the other diver dead."

The cause of death was drowning.

There have been over 500 cave-diving deaths worldwide.

"The majority of these are open water divers and diving instructors not experienced in cave diving," says Dr. Sawatzky.

To illustrate the level of danger and specialized knowledge involved, he compares open water diving to driving a car and cave diving to flying a fighter jet.

"Both (of the latter two activities) are relatively safe if you know what you're doing," he says. "If you don't, they're suicide. The biggest problem with open water divers is that they don't know what they don't know. And if you make a mistake, you don't get a second chance."

Another reason the explorers of the Ottawa River caves have been publicity-shy has been to protect the privacy of the owners of the property where the pools which are entrance points to the caves are located.

"They don't want people there without their permission," he says.

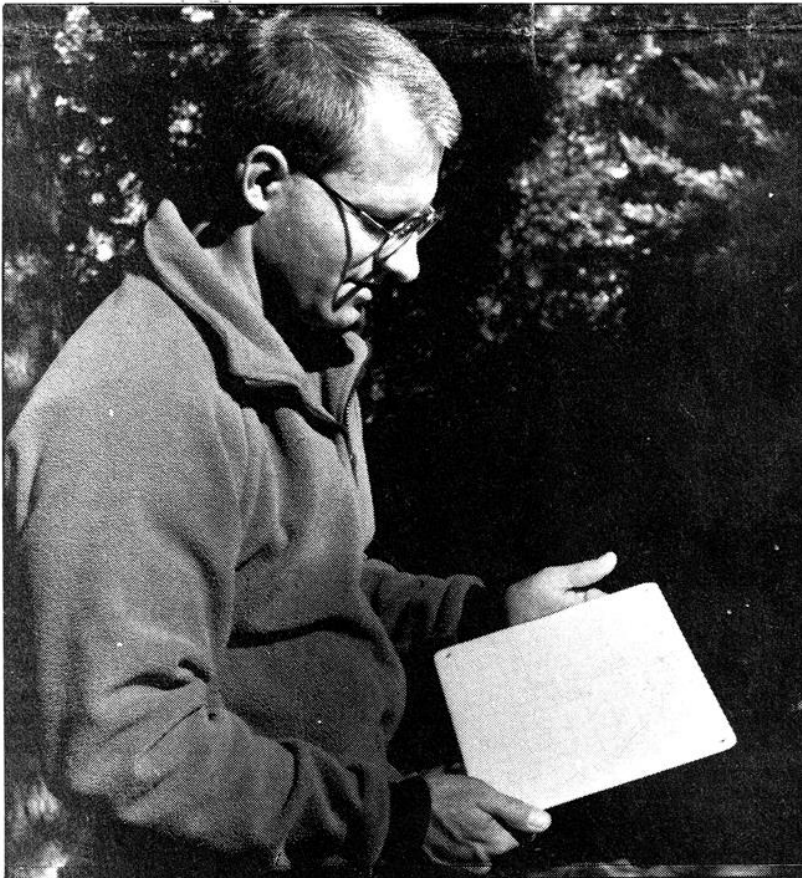
There's no way of knowing how much more there is to the Ottawa River cave system. There are known to be passages at two levels: one at from 10 to 15 feet below the surface -- with some pools created where the surface has caved in -- and another at 25 to 30 feet of depth. The caves themselves are approximately 12 feet deep.

"And there's no reason there couldn't be a deeper layer," says Dr. Sawatzky. "The thing about caves is that even the experts can't predict what's there."

He shares concerns about the possibility of locating a landfill site in or around the area he has is exploring.

"Some kinds of limestone are more likely to form caves than others," he says. "Obviously this kind does."

He says that, while water tends to move slowly under-



Dr. David Sawatzky hold an underwater slate, a piece of white plastic roughened by sanding. As cave passages are surveyed, data is recorded on such slates with ordinary lead pencil. The information is later noted or perhaps photocopied.

Surveying the passage walls is a complex task.

"Two divers have to work in concert," says Dr. Sawatzky. "The divers are keeping track of up to three tanks, regulators, pressure gauges, depth gauges, lights, watches, knives, fins, mask, buoyancy compensator, dry suit -- and you're underwater with current and very poor visibility."

The mainline must be marked every five metres along its length. One diver takes the end of a tape measure and places it on the first knot on the mainline. The second diver takes the tape reel and proceeds out to the wall, ensuring that he is downstream of the knot. He then pulls the tape tight and slowly moves up the wall until the diver on the line sees that the tape is perpendicular to the mainline. The diver on the line signals the diver on the wall via tugs on the tape to tell him that he is perpendicular to the line.

The diver on the wall reads the tape and marks the wall location on the underwater slate with a ruler. He then sig-

"When you get to this level of complexity, it's hard to find someone with the same level of skills and experience," says Dr. Sawatzky, 41. "When you find someone, you tend to dive with them."

Dr. Sawatzky and Mr. Browning have mapped approximately six kilometres of caves, about three and one-half under the Ontario mainland, and the remainder under the river bed itself and Fitzpatrick, Reid, and Allumette Islands in Quebec.

So why has this wonder of the world, which is the Ottawa River cave system, so far been one of the best-kept secrets in the world of natural science?

"We've avoided publicity because we don't want to haul any more bodies out," says Dr. Sawatzky.

One diver -- not with Dr. Sawatzky's team -- perished in a cave on one of the Quebec islands in 1988.

"He and his buddy were in a relatively friendly passage, and these guys had experience," says Dr. Sawatzky. "He signalled his buddy to go out. His buddy went ahead, and

was to move slowly underground, bedrock conditions such as those in the Westmeath area change the picture drastically.

"The thing about karst is that, instead of moving a couple of metres per day, water could be moving in it a couple of metres per second," he says. "If you put a garbage dump on limestone, you can be sure pollutants will end up in wells and rivers and all sorts of places you don't want them -- possibly many miles from the garbage dump."

Is there really a *lost snye*? Or is its existence the result of a tale re-told too many times on long Saturday nights in the logging camp?

We don't know.

Still -- its existence hasn't been disproven.

But what we do know about the Ottawa River cave system forces upon us new horizons to our understanding of a world we thought we knew so well.

We can only hope that future waste management decisions will acknowledge and respect the new boundaries imposed by this expanded knowledge.



Dr. David Sawatzky enters what divers know as Pool 1, part of the underwater cave network, while his diving partner, Ric Browning, watches. In the background, beyond a narrow land bridge, is the Ottawa River proper, to which Pool 1 connects.