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### THE NEW YORK TIMES **NATIONAL** SUNDAY, DECEMBER 15, 2013

# Scientists Turn Gaze **Toward Tiny Threats Invading Great Lakes**

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ic brig Niagara, Dr. Mason has collected more than 100 samples, which her students examine minutely for beads and other debris. They sort out the plastics from bits of fly ash and other products from power plant smokestacks and, using electron microscopes to compare the spheres with those from commercial products, have found them to be similar in shape, size and composition. (Sandblasting small beads as well, but they tend to be more dense than the beads in consumer products, and sink.)

In a recent paper, Dr. Mason and colleagues took samples that suggested concentrations of as much as 1.1 million bits of microplastics per square mile in some parts of the lakes' surfaces, with beads making up more than 60 percent of the samples. She has found beads in all five of the lakes, with the greatest concentrations in Lakes Erie and Ontario, which take the water flows from the other lakes and which are ringed with cities and towns.

While many of the beads appear to enter the environment when storms cause many wastewater treatment plants to release raw sewage, it is increasingly clear that the beads slip through the processing plants as well, Dr. Mason said at a sewage treatment plant in North East, a town near Erie.

She visited the plant to see if she could find beads in the clean water flowing from the plant at the end of the treatment process, after the removal of the organic

By DYLAN LOEB McCLAIN Russia overcame a dreadful start, including a loss in Round 2 to the United States, to win the gold medal at the World Team Chess Championship, the second most prestigious team event behind the biennial Chess Olympi-

China took the silver, and Ukraine, which led for most of the tournament before losing to Russia in the penultimate round, ended up with the bronze. The United States' performance was uneven, with the Americans ty-

ing the Armenians for fourth be-

fore edging them on tiebreakers. Several Americans earned individual medals, but Hikaru Nakamura, the country's top

player, turned in the squad's best performance at the tournament. which was held in Turkey and concluded on Dec. 5. He not only earned a silver medal, but slightly improved his rating, the system used to rank players. When the new rankings are released on New Year's Day, Nakamura, 26, will be No. 3 in the world. He will be just ahead of Vladimir Kram-

nik, Russia's top player, who stumbled in the tournament. Nakamura will be the highestranked American since 1975, when Bobby Fischer was world champion and No. 1. Nakamura

helped his cause by beating Kramnik in Round 2, and he did it

by squeezing Kramnik in an endgame, which is more typical of

In the top diagram, Nakam-

ura played 24 Qd3, forcing a trade

of queens. The game continued 24

... Qd3 25 Rd3 Nc1 26 Rd2 (26 Rd7 would also have been good) Rc8

27 h4 h5 28 b5 Rc7 29 Nc6 Kh7 30

Rb2 a5 31 Kf2 Rd7 32 Ne5 Rc7 33

Rd2 f6 34 Nd7 Nb3 35 Nf8 Kg8 36

Rd7 Rd7 37 Nd7 Nd4 38 a4. Kram-

nik, in desperation, played 38 ...

nik did not play 40 ... bc5 be-

cause Nakamura's pawn would

have been too fast after 41 b6. So

the game went 40 . . . a3 41 Nb3 a2

42 Ke3 Kf7 43 Kd4 Ke7 44 e4 e5 45

fe5 Ke6 46 Na1 fe5 47 Kc3 g5 48

Kb2 gh4 49 gh4 Kd6 50 Nb3. The

endgame was hopeless for Kram-

After 39 ab5 a4 40 Nc5, Kram-

Kramnik's style.

solids that sat ripely in large containers bound for a landfill.

Mike McCumber, a supervisor at the plant, challenged her: "You ain't going to find nothing!" But he helped her set up a pump to flush the water through fine screens, and after less than a minute, she had scraped a pearlescent sphere off the mesh.

"Hey, Mike! I think I got a bead," she told him.

"Oh, boy," he responded in de-

She was quick to point out that the sewage treatment plant is not designed to capture the tiny beads, which vary in size but are about as big as a period on a newspaper page. "It's not a design problem with the system," she said. "It's a design problem with the product."

Scientists are still working through the links of the chain leading back to humans; about 65 million pounds of fish are caught in the Great Lakes each year. Worldwide, the beads have been found in some marine organisms and not in others, and the transfer of poisons from the beads into the bodies of the creatures that eat them is still being estab-

It has been shown to happen in lugworms, which live in the North Atlantic, and Dr. Mason said, "If it happens in lugworms, there's a pretty good chance that it's happening in other species."

Lorena Rios Mendoza, an assistant professor of chemistry at the University of Wisconsin-Superior, said that the bits of plastic have a great capacity to attract persistent pollutants to their sur-

NAKAMURA/WHITE

Position after 23 ... Qc2

KRAMNIK/BLACK

Position after 29 Kc1

Though his performance over

all did not live up to his stand-

ards. Kramnik earned one of the

tournament's most impressive

victories in Round 6 against Alex-

ander Ipatov, a Ukrainian-born

grandmaster who now plays for

locked pawn structure seemed to

make a breakthrough impossible.

But Kramnik played 29...e5, and

the game continued 30 de5 Ne5 31

fe5 Qe5 32 Nf1 Bg7 33 a3 (33 Kd2

would have been a bit better) Qc3

34 Qc3 Bc3 35 Bd1 Re6 36 Bc2 Bg6

37 Nd2 Re3 38 Rd1 Bf6 39 Rhh1 d4

40 Rdel Rhe7 41 Re3 Re3. Ipatov

resigned because he would have

been helpless against an on-

slaught of pawns.

In the bottom diagram, the

nik, so he resigned.

Russia Wins Team Title

Despite Loss to the U.S.

face, and that the Environmental Protection Agency has classified some of those compounds as priority pollutants that can interfere with human physiology.

"Plastics are not just acting as mimic food, but they can also cause physical damage to the organism," she said. She has examined fish guts and found plastic fibers — possibly from the breakdown of synthetic fabrics through clothes washing — that are laden with the chemicals, and said she

expected to find beads as well. Some producers of natural facial products have found alternatives to the inexpensive plastics some of which can sound less like a cleanser than a variety of Whole Foods granola. St. Ives, a Sherri A. Mason with raw water from Lake Ontario. Samples are sieved and oxidized to remove organic material. Left behind are plastics including films, pellets, beads, foams and fibers. A slide show is at nytimes.com/national.

Unilever brand, uses natural exfoliants like ground walnut shells. A spokeswoman for Burt's Bees said the company had never used the plastic; its acne scrubs use jojoba beads, and its citrus facial scrub is made with "oat kernel flour, almond meal and pecan shell powder."

Dr. Mason applauded the use of alternatives, because there is no getting rid of the beads that are already in the water. Any attempt to skim the waters of the lakes to try to filter them out would scoop up plankton and other essential parts of the food chain, Dr. Mason said: "You'd be killing all the living necessary aspects of the ecosystem at the same time you're trying to extract the plastic."

So the answer to the problem of the tiny beads is to limit their use, she said. "We need to stop putting it out there."

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## Michelin Recalls 1.2 Million Tires

Michelin North America is recalling 1.2 million tires in the United States — including some used as original equipment on full-size Ford vans — because the tread might come apart, according to a report from the tire maker posted on the National Highway Traffic Safety Administration website.

Michelin said the LTX M/S tires in a 225/75/16 size were designed for "commercial light trucks, full-sized heavy duty vans, small recreational vehicles and some large pickup trucks."

Ford used the tires as original

equipment on the 2010 through 2013 models of its E-Series vans, a Ford spokeswoman, Kelli Felker, wrote in an email.

The E-Series is a full-size commercial van often used as an airport shuttle and formerly known as the Econoline.

Michelin said it had detected a "tread/belt endurance" problem through warranty claims and 20 claims from consumers seeking reimbursement for damage to their vehicles but there had been no reports of injuries.

Remember the Neediest!