

Volume 58 Number 6

# math **NEWS**

Friday, April 3, 1992



"Then my vacation took a turn for the better"

## The Sober-Again Prez Sez

What do you mean, "The term is over."? I'm not even ready for midterms! My first term as President of the Math Society has been a hectic one. "Intense" may be another good word for it. I've had several ideas throughout the term, and have received some suggestions. I will be working on these over the work term so that all will be ready first thing in the Fall. I will have my number in Toronto placed on the Watpub line (591-1650) during the first or second week so that you will be able to phone me with any thoughts, suggestions, questions, etc. regarding the upcoming term.

This term has run, for the most part, quite smoothly. This is owed to the great amount of work that the many volunteers (about 60 of them) put into the operation of the Math Society. This effort does not go unnoticed nor unrewarded, many believe that the MathSoc Volunteer End of Term Parties (just one of the many ways we say "Thank you") are the best parties of their university lives.

This term the Math Society has awarded the following honours:

### Honourary Lifetime Membership For Outstanding Service to the Society and/or the University of Waterloo

Sharon Fournier  
Brent McDermott  
Dee Vint

### The "Novel Idea" Award For Outstanding Effort as Novelties Director

Anne Fletcher

### The "Postman" Award For Outstanding Effort as Postings Director

Eric Verwijs

### The "Super Volunteer" Award For Outstanding Effort in Helping Others

Mike Abramczuk  
Dean Chan

I would like to thank the Math Grad Committee for asking me to be Master of Ceremonies for this past Math Grad Ball. I enjoyed the experience very much and believe that all those attending enjoyed it as well, as the MGB organizers did an amazing job. I hope that all of my graduating friends will keep in touch.

Lastly, I wish everyone Good Luck on the upcoming exams and I hope to see everyone at the Watpubs in the summer.

Have a good work term, see ya in the Fall!

Markus Baumann  
Math Society President

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## Orientation '92

Yo Dudes & Dudettes,

I want to start off by saying thanks to all those people who made it out last Saturday. It was a "Get-to-know-you" party, and I think we definitely achieved this due to the idea of the "No Pressure" roles or whatever they were called that night.

There are a few things I would like to say before everyone takes off for the summer. First and most importantly, if you have not handed in your form with your summer address on it, please do so as soon as possible. Just slip it under the Orientation Office door (MC 3043). Second, don't forget about the Orientation Weekend coming up July 17-19. This is where you will receive your leader shirts and find out who your Big Brother/Sister will be so don't miss it! Third, don't forget to ask your employers for promotional items when you're on work term. Anything and everything will be appreciated. Finally, if you are an event organiser, don't forget that your event must be fully planned by the Fed Orientation Weekend, July 10-12.

So good luck on your exams, party on in the summer and I'll see you guys July 10!

Later Dudes  
Oliver

## Club Stat Tells Tails!

*Thanks Everybody for the Great Term!!!*

The term has come to an end, and so we conclude with this article. I won't say very much, except thank you to everybody who has made this term such a success. Also, thank you to all of the faculty who have supported Club Stat all term.

Thanks especially to all those who made yesterday's Charity BBQ such a success! A special thank you is in order for Dean Chan, and his gang, who have made all of our events what they were through their undying, though sometimes painful, support and participation...(ps. The soccer games were great!) With everybody's help and support, we expect to have made about \$400 for the Shriner's Circus "send-a-needy-child-to-the-circus-fund".

As one last announcement, I would like to remind all Stat 230/231 students of our end-of-term final review workshop.

Monday, April 6: Final Review Workshop  
5:00 pm Stat 230 Probability Review  
7:00 pm Stat 231 Statistics Review

Both workshops will take place in MC5158. Pop and doughnuts will be served at both. Also, please, it should be noted that you must be a member of Club Stat in order to attend, since space is limited. Anyone who was at the midterm workshop qualifies for this one, but all others must sign up at the door. I apologize for any inconvenience this may cause, but again space to these workshops is limited and so we must do it this way.

I guess that is all for this term. We look forward to seeing you all again next term, if not before (maybe Monday night?).

Thanks again to everybody.

S. M. Fournier  
symfournier@descartes

## Editor Rants On

(An Editorial in mathNEWS???)

Yes. This *is* a serious article. I understand that many of you say that mathNEWS "sucks" if it takes on a serious tone (see "Editor Rants On Some More", below), but this is an issue that I believe must be addressed.

Two weeks ago, I attended the Math Faculty Council Meeting along with several other Society members. At this particular meeting, the Faculty was to discuss the topic of the Faculty Name Change for the last time, then call it to a vote. Those of us in Society Council who were the most vocal, or the most concerned, went to make sure the Faculty knew "the students' side of things". Our main argument was the survey that 200+ concerned students filled out near the C+D. Essentially, the results of the survey showed that we the students were AGAINST the name change. Even if the surveys were divided into CS and non-CS, both groups were against the change. Yes, even the CS people were AGAINST the name change, the people you'd think would be the greatest proponents of the change from the Faculty of Mathematics to the Faculty of Mathematical and Computer Sciences.

The results of the Faculty vote will be available sometime today (I'm sure they'll be posted somewhere around MathSoc sometime today or next week), so arguing about why or why not we should change the name is a moot point. That is not the reason for this article. What stuck in my craw was the fact that our survey was dismissed out of hand as crap; of course Faculty members were careful enough not to phrase it exactly like that. What they did say, one prof in particular, was that 200 students wasn't representative of 3500 — 5% of the student body is not statistically significant. To this point in particular, I have several things to say.

First of all, you're right. The 200 surveys that were returned are not representative of 3500 students. Yup. I agree. The 200 surveys were, in fact, representing the 1400 students *on campus!* which equates to almost 15%. This is certainly "statistically significant".

Second, the Math Society elections, which determine our executive Council members, has a usual turnout of less than 10% of all eligible voters. If we can stir up 15% of the students on campus to respond to the survey, they must have *something* important enough to say to wake them from their usual apathy in this Faculty.

Thirdly, if we had wished to do a proper survey to poll all 3500 students in Math, and it was seriously considered, then the Society would have had to spend hundreds of \$\$\$ for a mailout to those who are on workterms. I for one am glad we didn't go ahead with this mailout. Seeing how the opinions of those on *this* stream mean so very little, we would have spent the money superfluously. Faculty members would have patted us on the heads, said "Good students. Niiiiiiice Survey. Nice survey." then turned back to *their* conversation, ignoring us once again, as usual.

If 200 students don't represent 3500 students, then how can *two* be representative? I find it hypocritical to allow our two student Faculty Council representatives have a vote at Faculty Council meetings. Hypocritical? Yes! If *two* students are representative enough of 3500 students to vote at Council meetings, then what makes the concerns of 200 students *unrepresentative* of 1400 students? Why are our concerns dismissed with so little regard?

Lastly, in my opinion, the way the Faculty has disregarded student concerns and opinions shows little respect for us. The Faculty says changing the name of the faculty is a good idea, so by God, it *must* be a good idea — don't mind the nay-sayers

over there, they're just students. By not respecting the students, their concerns and opinions, the Faculty is showing their egotistical, patronizing views. You, the Faculty member, are not what this faculty is about, nor what it's for. This faculty is for and about US. The Students. And *we* are the reason this faculty exists! And if we continue to have nothing worthwhile to offer, as you have so obviously shown us with this Name Change Kangaroo Court, then there is something sorely wrong with this "democratic" institution. And I for one am not going to stand for it anymore!

Curtis Desjardins  
mathNEWS Editor, Winter 1992

## Editor Rants On Some More

(While I'm on a roll...)

It has come to my attention recently, not by word of mouth mind you, but by direct face to face conversations with people, that mathNEWS this term is not the paper it once was. Someone offered me some criticism about a recent issue of mathNEWS, and wanted to know if I would like to hear it. Sure. Why not? Want to know what he said? "That last issue really sucked!"

You know, I'm all for a little criticism, provided that it's *constructive*. Let me explain a little fact of life to you out there who think mathNEWS "sucks": mathNEWS is only as good as YOU make it! I'm only able to work with the articles that are written and submitted to me.

In the future, if you find so much wrong with mathNEWS, then I suggest you shut up and show us how it's done!

Curtis Desjardins  
mathNEWS Editor, Winter 1992

## Putnam Report

*U(W) kicks some mathematical ass!*

Last December, 2325 students from 383 colleges and universities in Canada and the United States wrote the six-hour William Lowell Putnam Mathematical Competition. Results were announced last week that U(W)'s three-man team of Danny Brown, Colin Springer, and Ian Goldberg placed second overall, defeating all but Harvard University.

Rounding out the top five teams were Harvey Mudd College [Say what? — Ed.], Stanford University, and Yale University, which placed 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>, respectively.

U(W) ranked four students in the top 40, as follows:

Name	Rank
Danny Brown	7
Colin Springer	13
Ian Goldberg	31
Peter Milley	40

Congratulations to the U(W) Putnam Team!

## Pure Math and C&O Club Stuff

Hello, hello. We had our End of Term General Meeting last week and attendance was phenomenal. Well, all right, it wasn't phenomenal, but it was pretty good. We had 14 members show up, as well as two unidentified people who came in, took a donut and pop and left. They were probably MathSoc goons.

A motion by Paul Check to censure Eric Sutherland, our great and wonderful Secretary/Treasurer, for not attending the meeting and being overly associated with MathSoc, was passed unanimously. This is the first time in our history that we have successfully passed a motion to censure. Congratulations Eric!!

Another motion by Paul Check was passed. (He's a busy boy, eh?) This was also passed unanimously. The Pure Math and C&O Club is no longer officially annoyed at MathSoc and accepts as an axiom its existence. No one is sure how we were previously annoyed at them without their existence. Probably the work of stark mad empiricists. Of course, since the existence of MathSoc is an axiom, there is no longer any need to believe that they really exist. It is hoped that no one will falsely conclude that since MathSoc exists, they must think.

Ever since the rumours of a Faculty name change, there has been a push from extreme right wing elements of our club to change its name to the Purely Mathematical Sciences and Combinatorially Optimal Sciences Club. In an attempt to silence these fiendish fellows, we passed a motion from Blair Madore, a suspected cohort of Paul Check's. As usual, it was passed unanimously. (Is someone influencing the voting in the Club or what?) Henceforth, the PMC&OC shall not change its name so as to include the word "science" or any derivative thereof. How do we know it's differentiable anyways?

These same right wing elements have also been lobbying for a new name for the Office. What kind of name is "Left-Angled Cafe", anyways? Well, this time the possibility of a name change sparked a number of suggestions for possible new names. Among them were "The Stoned Weierstrass Windowless Cafe", "The PMC&OCP+D", "MC 2065 & 2066" and "The Compact Space". After not so much discussion and a number of close ballots, "MC 2065 & 2066" was selected as the new name for our office. It is hoped that this new name will attract (confuse?) more frosh.

That leaves us with the important business that was discussed. A series of historical talks are being planned for next year. Upon hearing that it would take more than a minute or two to cover a given Mathematician, Paul remarked that his life must be pretty boring. At that point a number of people put up their hands, obviously thinking that this was a motion we were voting on.

Also, we are planning on becoming more involved in the MAA. We are a student chapter, and members can become student members of the MAA and receive a number of excellent magazines at incredible discounts (up to 90% off). There are also conferences in all sorts of exotic locations (Miami University, Oxford, Ohio) to which we are planning on sending representatives.

That's pretty much it for this term, so a good summer to you all and a good life to those of you who are leaving us. If you are going to be around in the summer, look for posters about the organisational meeting, or just drop by MC 2065 & 2066, our office, to visit and read the postcards I'll send from Gay Paris.

Da Prez, eh?  
What? Me serious?

## Actuarial Science Club

### The Final Chapter

Have you ever had one of those weeks where you are trying to juggle twenty things at once? Well, this is that week for me! Therefore, here are my important but brief words for the week: dog shoe tree

(For some reason, this all feels like *deja vu!*)

On a less surreal note, this has been an incredible term at the Actuarial Science Club. We have put on many successful events this term, including the recent success of the FireSide Chat with the presidents of the Canadian Institute of Actuaries and the Casualty Actuarial Society. Thanks go out to all of those who came out and devoured the food that we provided as well as listened to some very interesting speeches. I would also like to thank the executive and other people who helped organise various ASC events and staff our office throughout the term.

Because it is now officially the end of classes, there will be no regular office hours provided at the ASC. However, we will still be open on an informal basis (i.e. undoubtedly, someone will be using the office to avoid the congested EMS) so please drop on by if you need study materials or just want to chat. To those of you who have taken out study materials in the past, please return them promptly before the end of term.

Finally, you better get ready now for a whole bunch of great stuff this fall including a speech from the President of the Society of Actuaries (September 23rd) and two, count 'em, two trips to the Brick Brewery (TBA). Hope to see you all there. (Unless, of course, you're graduating.)

Garth...NOT!  
The Prez

P.S. The winners of our first ASC Squash Ladder (yes, there were games played) are Doug Shaubel, who finished first and undefeated, and Wayne Edwards, who finished with the most points. Doug wins an official ASC "I want my ASA" t-shirt while Wayne wins an all-inclusive trip to Vancouver this summer. Congratulations on a tremendous effort.

## MGC

Hi Everyone, The MGB was a huge success. The only complaint I heard was that the evening went too quickly — which is a good sign. Thanks once again to everyone who helped out. The 5x7 photos that Josten's took should be in by today. If they are in we will set a table up and distribute them. If they aren't in by the end of classes we will hand them out at Convocation.

If you haven't picked up your composite yet, please stop by MC 3029 and get it. Leave a message with your name and phone number under the door if no one is in the office.

The Darts & Euchre tournament went well. Paul Crawford was the winner of a \$15 gift certificate to Reuben & Wongs since he had the most points for Euchre. Mike was first in the Darts and won a \$15 gift certificate at Fastbreaks. Seema Wahdwa and Ken Watkins were the winners of 6" subs from Subway for their low scores.

Last event of the term: Fed Hall on Friday, April 3. Lots of prizes. See you there.

Tracy Kealey  
Angie Wong

## The Second Annual High School Math Conference

*Final Report from the Director*

We held the Second Annual High School Math Conference on March 19th and 20th. With over 85 high school participants from across the K-W region, the activities and lectures were very well received by everyone.

I would like to extend a special thank you to all those who helped out with the days' events, especially Glenn Chong, Jason Fournier, Blair Madore, Kirsten Nelson and Colin Springer for the lectures they presented. Also, thank you to the campus tour guides, solicited mainly from the realms of MathSoc.

I would like to express my deepest gratitude to Prof Wainwright who again took part in many of the planned events. Prof Wainwright has supported the conferences from the very beginning, when the thought of inspiring high school kids to two days of math lectures and activities, on their March break, was thought to be completely absurd.

On closing, I would like to thank MathSoc, the Faculty of Mathematics and all who helped out on our fund-raising activities for their financial support.

P.S. Jason says he had a lot of fun, and a lot of pizza, so he's in for next year!

We look forward to another successful conference next year!

S. M. Fournier  
symfournier@descartes  
High School Math Conference Director

## External Affairs

Hello fellow Mathies!

The faculty council has until today to vote on the motion to change the name of our bold Math Faculty to Math- and Comp-Sci Faculty. I have given all comments that were passed on to me (thank to those that took the time to give me their opinions), and by the end of the day, our name will know its fate after the ballots are counted.

Unfortunately, this is the last mathNEWS this term, but I will post the results as soon as I know on Monday (the sixth) in uw.general on the computers, and hopefully I will have a couple of posters up too.

Again, I'd like to thank those who gave me some input on this subject ... without you, I have no students' voice to represent.

Have a real, real, REAL (Jesus Jones) cool summer, and see ya next term!

Jason Fournier  
External Director

Oscar Binary by Bunt & Not a square



## CSC Flash

<Disclaimer: The Flash in no way reflects any strange habits of the CSC executive.>

Ed: Our last reporter, Jack Handy, died not long ago after a freak accident with a balloon, some nails and a small carton of milk (I told you!). Ace reporter Red Line has been assigned the job of tracking the elusive Calum T. Dalek, returning from vacation in the Australian Outback...

...Ace reporter Red Line here, trailing the 100m dustplume spearheaded by CSC Chairbeing Calum T. Dalek. Sir Dalek paused a few days back for a beer in a local saloon, where he honoured me with a few words on the year-end events of the CSC...

- The traditional Ctrl-D (End-Of-Term) dinner was held once again at McGinnis Landing. Several CSC speakers, including Jo Ebergen (The Preliminary ACM Contest Meetings) and Qiang Yang (AI: Past, Present and Future) were treated to munchies by the CSC. We had fun, we had sun, we had nachos. And it was good.
- On Tuesday, March 24, we packed out yet another lecture hall for a CSC event. Almost 100 people turned up to hear a very interesting (and entertaining!) talk by Dr. Deborah Stacey. Donuts were munched, tea was sipped, dendrites unravelled. And it was sharp.
- At around 11:30 on Saturday, March 21, the words "Gentlepeople, start your editors!" were bellowed by CSC president Dan Astoorian, and the Preliminary ACM Programming Contest got underway. For three grueling hours a Descartes-roomfull of brutal programmers were brutalized by four brutal questions. The top eight contestants, primed for the real ACM contest this fall, were

Ian Goldberg	511
Brad Bobak	494
David Ebbo	442
Jonathan Forbes	436
Dale Wick	434
Brad Bart	421
Stephen Tomlinso	400
Brian Rossmajer	347

And let me tell you, it was brutal!

Well, from the looks of things, Chairbeing Calum T. Dalek has flown off to the Med. and our yacht and I haven't even finished my beer! So farewell for now, and may the good news be yours!

Ace Reporter Red Line  
<hick!>

## Prof Quotes

"That would be an idea; you could borrow money from Japan, blow them up, and then not have to pay them back...I guess that would be optimal."

Dave Andolfatto, Econ 302

"Do you like the way she handles Doyle, I guess it's something only a woman can do"

Kao, Acc 351

"You may have recurrent nightmares about this."

Bennett, Stat 331

"That would be a mean trick, wouldn't it ...to get you to do this for homework. By hand."

Hamada, Stat 331

"And so you break the job down so that any idiot can do it. Then you hire a bunch of idiots ...How many people here have worked at McDonalds?"

Graham, CS 230

"Now that you've experienced the mother of all hot flashes ..."

Ian McGee, AM 343

"Grad school is great ... you only take a couple of classes, write a bunch of things on paper, hand it in, and they give you a degree for it."

W. Martin, C&O 380

"I hope you were all polite to the little ankle biters running around campus today"

McGee, AM 343 (on campus day)

"I'm pausing for a moment; I'm waiting for something to happen."

Graham CS 230

"I'm saving the last 15 minutes so I can babble."

Graham CS 230

"Trucks don't have a penis. They're not an inherently male thing."

Rempel, Psych 211

"I do not know who I am. I do not care. I am aimless. I like it that way."

Rempel, Psych 211

"...if you've got a younger child ...really young ...you know, the afterthought, the accident ...I was one of them, although I like to think of it as Divine Intervention."

Rempel, Psych 211

"The instructor's a dingbat!"

Cardey Psych 357

"It seems we blame a lot of things on mom in this course ...Here's something else I can hate mom for!"

Cardey Psych 357

"and this means well ...damned if I know, I haven't the foggiest."

Graham CS 230

"Sex is only one byte wide."

Graham CS 230

"I can take the time from the beginning of class until I lose you, this has a Poisson distribution. Maybe I'll get a negative time because you'll be lost before you come into class."

Springer, Stat 230

"I'm going to do a times b on c ...or something like that ...I'm not sure what I'm going to do yet."

Cummings, PMath 334

"A speaker in the DC today proved it, but I couldn't follow it."

Cummings, PMath 334

"Could you close the doors please? I don't like people peeping around. Everything we say here is TOP SECRET."

Tong, PMath 336

"I'm having a good time up here ...NOT."

Panjer, Actsc 332

"Approximately true. What the hell is approximately true. That doesn't make any sense."

Lewis, Stat 330

"Obviously we've got ...obviously hell. I've got to look at my notes."

Lewis, Stat 330

"The only thing we know with certainly right now is that everything I've said in the last 5 minutes is wrong."

Scott, Econ 402

"Don't be afraid of the big O!"

Sivaloganathan, AM 464C

"... unless you have something mechanical blowing on your bottle."

student, PMath 353

"How come everything I say, you shake your head?"

MacKay, Stat 230

"If you haven't seen the quotient structure before, you're going to suffer right now."

Zorzitto, PM 453

"There's sometimes a danger of confusion, but I won't bother clearing it up."

Zorzitto, PM 453

"Try to recollect some measure theory, or pretend that you believe what I'm going to write."

Zorzitto, PM 453

"Believe me, we did that, whether you know it or not."

Zorzitto, PM 453

"Maybe I should write it down in a little more detail in case you look at your notes someday."

Baker, PM 452

"That's a nice little series we've discovered. Well, we didn't discover it, I read it in a book somewhere."

Baker, PM 452

student: "Could you explain why going from m to infinity gives a bigger integral?" "No."

Baker, PM 452

## Look Out World!

It was the best of times, it was the worst of times. Isn't life funky! It seems like just yesterday I started here and *bang!* just like taillights, I'm outta here!

Cool things since F85

- finally figuring out the 6th floor
- taking 3 years off to reflect on life
- taking the YZ through a snowstorm to visit the girlfriend in T.O.
- frosh week pub crawl
- getting unofficially accepted to Laurier for F92
- finally passing my 3rd 1B calculus final

Shaka things

- being denied a bursary (if I *had* the marks I'd be getting a scholarship!)
- failing 1B calculus twice

Weird things

- passing up a job offer in L.A. to finish at U(W)

It's been! Ciao!

Kimbo

## Pink Stuff

It is perceived that 20% of the people make the decisions for the other 80%. But in fact, 20% of those people actually make the decisions. In the past, 60% of the people said 'NO' to a Student Life Building. But 4% of the people decided otherwise and so after a second try, most people voted in favour of the building. 4% of the math students want to change the name of the C+D for some unknown reasons. Too many people oppose the idea so it has been 'put on hold' for now.

Why do leaders try to force personal goals upon the society in general? The only reason I see for getting into politics is for the money. Not the salary, which is usually poor, but the fringe benefits of course. So what I can't figure out is the reason for the fuss over our own Math Society President's decisions. Even if he did unacceptably apply MathSoc funds, so what! Too many people get upset about things but don't do enough about it. Is it not better to say nothing and get on with your life? The present scandal in the Math Society will be forgotten over the summer anyway, and then there will be no other worries than what to give for Christmas. Seriously though, it is probably better for the Prez to resign. Not as an admission of guilt, but instead, to uphold the integrity of the Math Society...

Graduation! My final recommendation to MathSoc: A special project of the 2<sup>nd</sup> VP-Services should be to fix the Math Society. Look at how and why spending occurs, an efficient way to get music to the clubs, even a 'what to do when' review. And while you're at it, review the purpose and beliefs of the Math Society. I can't believe that after 25 years we still can't get it right.

Kimbo

[The opinions of the author of this article do not necessarily reflect the opinions of mathNEWS, its editor, or its staff — Ed.]

## Co-op Job Opportunities In Japan

The Department of Co-operative Education and Career Services has been actively involved in the formation of a consortium of four Canadian Universities (University of Waterloo, Université de Sherbrooke, University of Victoria, and Simon Fraser University) for the purpose of developing employment opportunities in Japan for co-operative education students enrolled in Engineering, Applied Science and Mathematics programs. The Consortium has full support of the Federal Government.

The director of this placement program (entitled the Co-op Japan Program) is actively developing job opportunities with prospective employers in Japan and we expect placement of students under the program will begin in 1992 with perhaps 5 - 10 students and increase in the following years as interest and participation of employers in Japan increases.

We anticipate that the jobs will be made available to senior (3<sup>rd</sup> & 4<sup>th</sup> year) students in the above mentioned programs and that placements will be for a period of between 8 to 12 months, depending on the particular situation.

Students who are interested in the co-op Japan Program will be required to prepare themselves prior to embarking on the work term in Japan. They must have language capability in Japanese, acquired by successfully completing levels 1 and 2 of the Japanese language courses offered by the East Asian Studies program at Renison College, or by some other means. Equivalent background in the Japanese language will be considered.

If you are interested in participating in the Co-op Japan Program, please see Margaret Grosch, International Liaison Co-ordinator, in Needles Hall, Room 1079.

## GINO'S PIZZA

Try a little bite of Italy  
747-9888

The Official Pizza of math NEWS  
160 University Ave. W.  
Waterloo



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**FREE 6 PACK COKE!!!**  
with 2 Large 3-Item Pizzas  
\$15.99 + tax  
or 2 Medium 3-Item Pizzas  
\$12.99 + tax  
Expiry Date April 30, 1992  
Good luck on finals from Gino's

## Ultra Classifieds

Attention Jim (CS134),  
You drone on and on, And on and on, And on and on! And, just  
when we think you're done: On and on and on you go. Think  
about it.

The Bruces

All,  
Ciao! It's been a slice.

Mike A.

To all the people who posted illegal notices, thanks for a won-  
derful assortment of pushpins and thumbtacks. The Math Soci-  
ety greatly appreciates them.

F.Verwijs  
Math Society Postings Director

To the Fake Orgasm Chicken-Out,  
Pulled anyone's pants down lately?

Fed Hall

Sparky,  
Seen any good pictures lately?

the MathSoc gang

To whom it may concern,  
Who's seen Markus in his underwear?

## Top 10 STAR TREK: The Next Generation Episodes That You Will Probably Never See

10. The Enterprise blows up and it is for real.
9. Deanna Troi states anything other than the clearly obvious.
8. The Enterprise travels to the Death Star where Darth Vader  
tells Picard "Jean-Luc, I am your father."
7. Geordi tells Picard that he will need half an hour to fix the  
warp engines. Picard says "Do it in 10," and he can't do it  
in 10 minutes.
6. Worf finds himself a girlfriend and gets all mushy.
5. Q shows up and is helpful.
4. Tasha returns from the past carrying Data's child.
3. Picard obeys the Prime Directive and as a result allows an  
entire planet to be destroyed.
2. The Enterprise crew face a catastrophe that they are unable  
to solve.
1. During an unannounced stop on Earth, Picard visits the  
House of Masters.

Chips

## Bricks and Barrels

Good Friday, dear readers. Today we bring you a bricklayer's  
accident report that was printed in the newsletter of the En-  
glish equivalent of the Workmen's Compensation Board. So  
here, thanks to Friday-file John Sedgewick, is the Bricklayer's  
accident report:

Dear Sir: I am writing in response to your request for addi-  
tional information in Block #3 of the accident reporting form.  
I put "Poor Planning" as the cause of my accident. You said in  
your letter that I should explain more fully and I trust that the  
following details will be sufficient.

I am a bricklayer by trade. On the day of the accident, I was  
working alone on the roof of a new six-storey building. When I  
completed my work, I discovered that I had about 500 pounds  
of bricks left over. Rather than carry the bricks down by hand,  
I decided to lower them in a barrel by using a pulley, which,  
fortunately, was attached to the side of the building, at the sixth  
floor.

Securing the rope at ground level, I went up to the roof, swung  
the barrel out and loaded the bricks into it. Then I went back  
to the ground and untied the rope, holding it tightly to insure a  
slow descent of the 500 pounds of bricks. You will note in Block  
#11 of the accident report that my weight is 135 pounds.

Due to my surprise at being jerked off the ground so suddenly,  
I lost my presence of mind and forgot to let go of the rope.  
Needless to say, I proceeded at a rather rapid rate up the side of  
the building.

In the vicinity of the third floor, I met the barrel which was  
now proceeding in a downward direction at an equally impressive  
rate of speed. This explains the fractured skull, minor abrasions  
and the broken collarbone, as listed in Section III of the accident  
reporting form.

Slowed only slightly, I continued my rapid ascent, not stop-  
ping until the fingers of my right hand were two knuckles deep  
into the pulley which I mentioned in paragraph #2 of this cor-  
respondence.

Fortunately, by this time, I had regained my presence of mind  
and was able to hold tightly to the rope, in spite of the excruciat-  
ing pain I was now beginning to experience.

At approximately the same time, however, the barrel of bricks  
hit the ground — and the bottom fell out of the barrel. Now  
devoid of the weight of the bricks, the barrel weighed approxi-  
mately 50 pounds.

I refer you again to my weight in block #11. As you might  
imagine, I began a rapid descent down the side of the building.

In the vicinity of the third floor, I met the barrel coming up.  
This accounts for the two fractured ankles, broken tooth, and  
severe lacerations of my legs and lower body.

Here my luck began to change slightly. The encounter with  
the barrel seemed to slow me enough to lessen my injuries when  
I fell into the pile of bricks and, fortunately, only three vertebrae  
were cracked.

I am sorry to report, however, that, as I lay there on the pile  
of bricks in pain, unable to move and watching the empty barrel  
six storeys above me, I again lost composure and presence of  
mind and let go of the rope.

Sincerely,  
Policy #XYZ23456789

E.T.  
the extra-terrestrial



## mathNEWSquiz #6

Hi, everybody! Welcome to this issue's mathNEWSquiz! How is everybody doing? (silence) I can't hear you ... (Scream of approval) That's better! Now, let's re-cap the answers of last week's quiz. Here we go: 1- Algar; 2- Aurora Illinois (a suburb of Chicago); 3- Aurora Cable Access 10; 4- Madonna; 5- Batman; 6- Pump Up The Volume; 7- Terminator (the first); 8- Dreamscape; 9- Sulphur; 10- Earth reaches its perihelion; 11- palmistry; 12- perfect numbers; 13- Billy Batson; 14- Captain Marvel; 15-SHAZAM: Solomon, Hercules, Atlas, Zeus, Apollo, Mercury; 16- Black Adam; 17- Tommy James; 18- Five Man Acoustical Band; 19- Who cares? Nobody got it right.; 20- Brownhill Station.

Now that you've got a low-down on last week's answers, let us tell you who actually submitted their solutions: Live From Ottawa ... HAMMER! (7); Cosmic Charlie (8); and the winner is (drumroll) The Bastards of Cha-Ching (13)! You can pick up your prize in the MathSoc office during the next short while (that is, when it's open during exams). Well, it's goodbye for this term. See you next term, squizzers, and good luck on your exams! The answers to this quiz will be posted sometime next week on the Soc office door.

### Sports Trivia

1. Who is the honorary captain of the Boston Bruins, and who is the honorary captain of the Philadelphia Flyers?
2. What is the name of the former baseball player who went on to be the star of a television series, and who also guest-starred as the villain in an episode of "Matt Houston?"
3. What is Kareem Abdul Jabbar's birthname?
4. Name the professional football player who became a professional wrestler whose nickname was an old movie monster's namesake.

### Disney Cartoons

1. What was Bambi's girlfriend's name?
2. Who has a red nose — Chip or Dale?
3. What was the beauty's name in Beauty and the Beast?
4. Who was originally known as Dumb Dog?

### Movie Quotes

1. "Bunny...ball-ball."
2. "I lost my job, I lost my wife, and I've got a rash from making in the bushes."
3. "If I wear it anywhere else, it chafes."
4. "Please, God! We need a cab!"

Harry Organs  
major  
Fluffy the Wonder Bunny  
Mouse # 2

## Logic Puzzle the Fifth

Hey, some really nice solutions this time. Correct submissions were received from Live From Ottawa...HAMMER! (Great answer, as before); Thunderstorm (perambulating gently); More Vern Than Thou (Ernest? Is that you?); The CC Bridge Society (Spock?!); and Admiral Lee (aw, be creative, will ya?). Incorrect submissions came from Bamm-Bamm (check out the ps); and Molly (square field, Molly!).

The prize goes to that Ottawa guy again. (How can I resist? The guy writes three pages of funny answer. Heck, that's more work than I put in!) You can pick up your prizes when you get back next term, in the MathSoc office. (But I gotta tell you, the rest of you are getting better. Maybe in the fall...)

### Time for another puzzle

It was Tuesday, March 10, somewhere in the 21st century (nobody was quite sure where). After the Great Economic Collapse of the 1990's, six universities were left in Canada: The University of Waterloo (UW); Wilfrid Laurier University (WLU, by some twist of fate); University of Windsor (U of W); University of Western Ontario (UWO); Winnipeg University (WU); and University of Whitehorse (also UW).

Sevastopol Wilya, Andea's son (no, I haven't figured out how these men reproduce, and I don't care to know), had five brothers, and each of the six attended a different program at a different university. As usual, the most entertaining correct answer... hey! there are no more issues! Oh well. The solution will be posted next Friday on the mathNEWS door.

1. Sevastopol was in Math at Waterloo. He is the protagonist, you know.
2. Neither Anders nor Guillermo went to WLU — however, one of them ended up in Engineering.
3. Gennady was in medicine or health — he was never quite sure.
4. U of W offered non-arts programs.
5. The person that went to WU had the initial G.
6. Georg did not go to one of the UW's.
7. Gregor was a good friend of the science student.
8. WU did not have a medicine program.
9. Gregor went to UWO
10. Guillermo is in arts.
11. Neither of the UW students could stand the medicine student.
12. If 18 is true, then 16 is not.
13. 7, 2, 1, 3, and 11 have the opposite truth value from 18.
14. 15 and 18 have opposite truth values.
15. No fewer than one of 14 and 17 is false.
16. If 8 is true, then 3, 5, 13, and 19 are false. If not, then 2, 7, 9, 12, and 14 are false but 3 is true.
17. At least one of 8, 10, 13, or 19 is false.
18. 16 and 12 have the same truth value.
19. 4, 5, 6, and 9 are all false.

Who, Me?

## Math, the Universe and Everything

*Exams : Stress is your friend.  
You love stress. Stress is fun.*

Once again, final exam time is here, and many people are feeling stressed out. It is a generally accepted fact that too much stress can cause a poor showing on exams. All of us should try to maximize our performance on upcoming exams by minimizing the amount of stress we are undergoing.

Leisure physics tells us that the best way to reduce stress is to simply remove the tensions that are causing the stress. This can be done in a large number of ways. As a public service, mathNEWS is happy to present ten proven methods of stress reduction that are guaranteed to work.

### 1. Spend all your time drunk.

This is a popular form of stress avoidance. It is quite easy. Have a beer. Have another beer. Repeat until you fall down. Why else do you think the Bomber opens up its patio this time of year? It's their way of saying, forget about it, have a beer, and watch the good-looking members of the opposite sex walk by. That's right, boys and girls, irresponsible alcohol abuse is fun and educational, too.

Showing up to your exam drunk is not as bad as people seem to think it is. Not only will you probably do better in subjects such as Calculus, which no sane person understands, but you'll be the life of the exam room. The possibility of throwing up on your exam only adds to the excitement of this — remember, you paid your fees, so that idiotic prof of yours has to mark your exam, even if it has the remains of last night's triple chili cheese dog on it.

### 2. Go insane.

Going insane is not nearly as popular as it used to be. Back in the sixties, all you had to do was drop twenty or thirty hits of acid and just about anybody would be ready to write you off. In the politically correct nineties, however, this is not an option. This moronic "Just say no" campaign makes it almost impossible to form lasting chemical dependencies in time for exams. However, if you can convince those guys at Health & Safety that you're insane (what? H&S making a misdiagnosis? I don't believe it...), then you're on your way. Good things to do to prove that you're insane are:

1. Go into CS/EEE.
2. Hang around Needles Hall for the friendly atmosphere.
3. Expect to get a co-op job in your 1B term.
4. Agree with the Imp'tint editors on anything.

The careful student should beware: it is no longer considered a sign of madness to sit in a corner of your room and drool. This may still get you out of your exams, however, as most people will assume that you're an Arts student.

### 3. Commit suicide.

Let's face it, guys, not a very smart thing to do. Sure you won't have to write your exams and all, and your stress level will drop hugely, but that weasel-like roommate of yours will automatically get a B<sup>+</sup> average. No way you want that to happen.

### 4. Drive your roommate to commit suicide.

Now you're thinking along the right lines.

### 5. Report early to your co-op or summer job.

This is a great way to reduce stress, since not only will you cease to worry about exams, but you will be making money. And since most co-op jobs expect you to think at the level of a trained monkey, on-the-job stress will be non-existent.

### 6. Run away, and follow Spinal Tap on their world tour.

This is the preferred tactic of Tapheads everywhere, and my own personal plan of action. Now that the greatest rock band in history is back together, we can all take off and live the glorious life of groupies.

Tap into the nineties!

### 7. Have sex with your prof.

This has been done many times at many schools. You must be subtle when introducing this idea to your prof. Please note that while suggesting a "late night study session" is subtle, offering "hot oral sex" is not.

But if you do manage to get your prof into bed (or on his/her desk), be sure to pretend to enjoy yourself. (Actually enjoying yourself is, of course, out of the question, considering the profs we have in math. Ugh. Except Becker - he's kinda cute.)

### 8. Cut off a limb.

This is rather drastic, because it is impossible to successfully fake amputation. But the trauma caused by this gives you an excellent reason to miss exams.

Another drawback: this will only work four times.

Warning: your head is not a limb.

### 9. Get arrested.

This is great fun. Trust me, I've tried it. Anyway, getting arrested and charged and waiting for your trial will easily take you past the exam period. Please note that if your cellmate is named Big Bubba, you may have a whole new (or is that hole new) set of worries.

### 10. Get kicked out of the exam room.

If you're not planning on sticking around the exam room long enough to finish writing the exam, then studying for it will be no problem. It is hard to believe how little one has to do before getting kicked out of the exam room.

A favoured tactic is to start running around the exam room, screaming at the top of your lungs. Bonus marks are awarded for every exam you manage to steal.

A variation on this can only be done if you happen to be writing on the upper level of the PAC. Yell "I can't take it any more," and jump off the balcony into the main section of the gym, where other students are trying to write. Of course, the sheer drop will probably kill you, but just imagine the look on some guy's face as you smash head-first into his desk, crushing his legs and spilling brains all over his exam.

That's what life is all about.

Other things to do include stripping, killing a proctor, or letting chickens loose in the exam room. (Note that if we were in engineering, some or all of this would have occurred to us during frosh week. Whatever else is to be said about them, the engineers have incredible fun during frosh week. But at least ours is politically correct. Wheee.)

And finally....

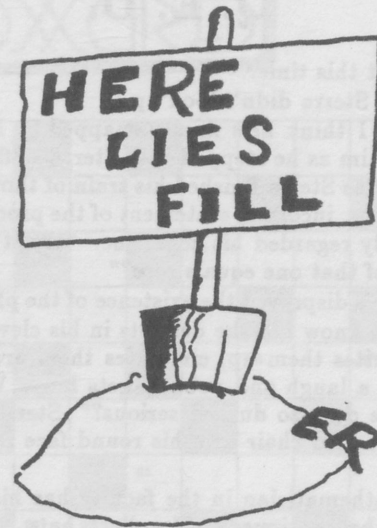
Good luck during exams. If I happen to pass any of them, you'll be hearing from me again in September. Have a good summer.



## Attention mathNEWS Prize Winners!

Due to some process errors, some mathNEWS prizes (i.e. coupons) are not being accepted at the C+D. If you are the proud owner of one of this term's coupon prizes, please see Curtis in the MathSoc office to trade up to a much better coupon prize (i.e. bring in the old one and we'll give you a new one). Sorry for any and all inconveniences related to this error.

Calum Strikes Again  
Kimbo



## mastHEAD

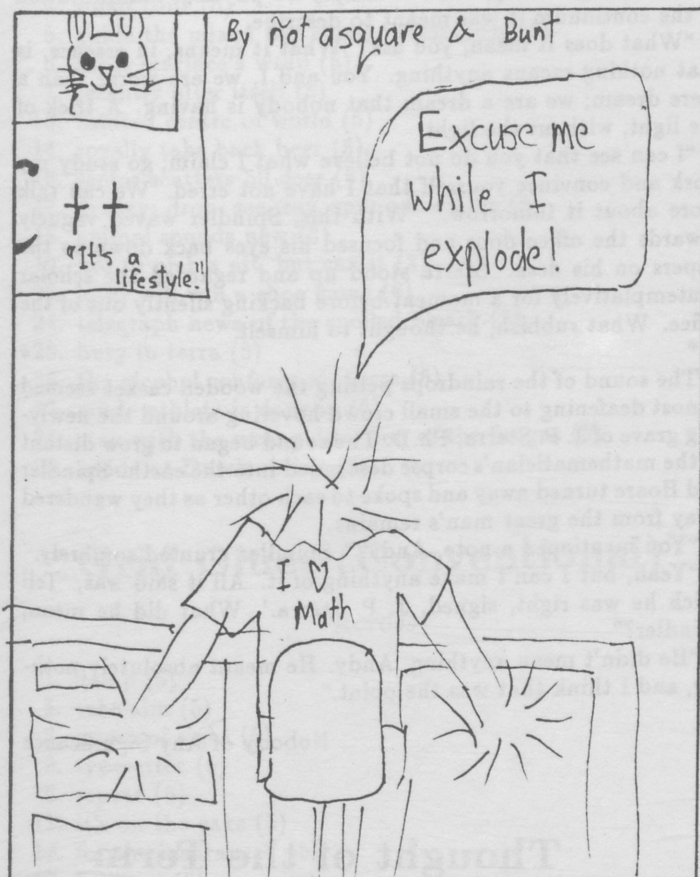
*Yet Again, Still Even More Tales from the High Chair*

Hi again, oh loyal readers. By the way, who reads the masthead anyway? \*shrug\* Anyway, this is my last term as edi-dude here at mathNEWS. And my last term as a student in this faculty for that matter. Where the hell has all the time gone by? I must not want to leave too badly — I'll be back in the Spring for... Psych! Looks like I won't be out until '94 (unless I come back for my M.A. — yes, I *am* a weirdo, what of it?) Anyway, as this is the last masthead I'll ever write (hey, can I edit *next* winter?), I'd like to wish Christine good luck on editing in the spring, and Kivi in the Fall. More than likely I'll be on staff, once again doing production and squizzes. \*sob\* \*sob\* I don't wanna go! Wah!!!! Anyway, here's everyone who came out tonight along with their year, major, and favourite proverb: Kivi Shapiro (3B C&O, Hunger is the best pickle [*Say what? — Ed.*]); Mishelle Ducedre (3A C&O/CS, Never eat spinach with a stranger); Brent Williams (1B CS/AM, I have to think hard to name an interesting man who does not drink); Stuart Pollock (1B CS/AM, "I see" said the blind man as he picked up his hammer and saw); Mark Brockington (4B PM/CS, Just because you're not paranoid doesn't mean they're not after you!); Jeff Stammner (3A CS/C&O, Never eat the yellow snow); Steven Shaw (2A CS, Hey, there's a wolf on your head); Dale Wick (2B CS, I've never met a blind penguin I didn't like); Ian Goldberg (1N PM/CS, Fiddle with it 'til it works, then you're done); Jason Fournier (1B ActSc, Life's pretty funny sometimes...); Jennifer Watters (3A STAT, If at first you don't succeed, it wasn't meant to be); Mike Abramczuk (4B General just like my buddy Curtis!, Fun is fun 'til someone gets poked); Shannon Mann (3B IS, Don't be a turkey: when it rains, close your mouth).

Special thanks to Gino's pizza (the *Official* pizza of mathNEWS), Graphics Services (Hi Marion!), and of course to Def Leppard, Barenaked Ladies, Rush, Rod Stewart, and the Crash Test Dummies to name only a few! Have a great work term, and for those of you who are actually graduating and leaving this place, never to return, pray for me.

[Productionist's note: Again — no mention of pIATmN, the new mathNEWS production system! And on my birthday even!]

Curtis Desjardins (4B General? (only 5 years to get a 3 year degree!), Sex is not the answer. Sex is the question. Yes is the answer.)



Pre-exam stress relief

## Q. E. D.

"He's lost it this time."

"Hmmm?" Sterra didn't look up.

"Spindler. I think he's finally snapped." Hoare closed the door behind him as he stepped into Sterra's office. There was a lengthy pause as Sterra finished his train of thought and stroked out the previous, incorrect statement of the proof he was working on, and finally regarded his colleague. "What's he up to now? Another proof that one equals zero?"

"He says he's disproved the existence of the physical universe."

"And? You know how he delights in his clever little fallacies, Andy. He writes them up, circulates them around the faculty, everyone has a laugh and nobody gets hurt. Why do you take everything he does so darned serious?" Sterra paused and sat back in his padded chair as a his round face relaxed into a soft smile.

"Every mathematician in the faculty has his or her little idiosyncrasy," he continued. "I collect hats. Sometimes Joan throws a frisbee around with the undergraduates from her office window. Phil nearly burned down the building with his toy rockets, and need I mention your own little penchant for children's books? Erich Spindler is a harmless eccentric."

"It's different this time, J.P. He's serious. It's not a joke, at least he thinks it isn't. He's actually talking about publishing it!" Andrew Hoare stuffed his hands into his pockets to force himself to stop fidgeting with them. He was usually a nervous sort, and Spindler's current preoccupation didn't calm him any. The worry in his eye faded Sterra's smile — slightly.

"Oh, he's just having you on. You know how much fun you are to tease, Andy. Remember when he told you he had solved Fermat's Last Theorem using Goldbach's Conjecture? You fell for that one hook, line and sinker."

"I'm telling you he's serious. Talk to him, J.P. He listens to you."

Sterra let out a hearty laugh. "Fine. I'll talk to him, if it'll make you feel better. But I think you're taking this much too seriously, as usual. Go back to your office and unwind with some Dr. Seuss."

Hoare raised an eyebrow at Sterra, making it very clear that he thought Sterra was taking the matter much too lightly. He muttered to himself under his breath as he wandered absently out of the office. Sterra flicked a hat off the rack behind him with a meaningless flourish, catching it with his other hand in a display of agility which, had anyone been present to witness it, would have been considered impressive.

"Erich?" Sterra knocked at the door of Spindler's office, but it was more or less understood that this was a mere formality. Sterra and Spindler had known each other since they were undergraduates; there had always been a friendly rivalry between them. Spindler indicated, with an almost imperceptible nod, for Sterra to enter; his eyes remained glued on the papers in front of him. Sterra sat, and waited patiently for Spindler to return from his mathematical diversion.

Fifteen minutes later, Spindler sat up and greeted his old friend. "Have a look at this, J.P. What do you think?" He pushed a sheet of paper in Sterra's direction. It read:

*Abstract:* One of the traditional applications of mathematics is as a tool to model and explain observations in the physical sciences. This, however, assumes as an axiom the observations which are being modeled. In this paper the author demonstrates that the existence of the physical universe is, *a priori*, precluded by formal mathematical logic alone.

"I know that look in your eye, J.P. You think I'm a couple of vectors short of a spanning set, don't you? Not that I blame you. Admittedly it sounds absurd. But absurdity is really what it's all about. I fear I am not making myself clear.

"I've proved something quite astounding: nothing exists. The entire universe resolves into a contradiction, one so simple as to be undeniable. Drink?" Spindler poured two glasses of bourbon and handed one to Sterra, who took a quick sip. Spindler downed his in one fell swoop. "I've worked it out several times. There's no mistake in the mathematics," he continued, chewing absently at a fingernail. "You can look it over if you like; you won't find anything."

The hell I won't, thought Sterra. World-class mathematician or no, I'll be a monkey's uncle if I'm going to let him tell me I don't exist.

"All right, then, Erich. What if you're right? Suppose reality is, as you suggest, a load of bunk. What in the name of Copernicus does that mean? Do you intend to jettison the whole of mathematics from its first axioms?"

"If only it were that simple, my old friend. It is not the mathematics that are in question; it is the physical universe. My proof — forgive my arrogance in not referring to it as a conjecture until you have verified that it is, indeed, a proof — does not rely on such vague assumption as, for instance, the parallel postulate; if that were the case I would merely have demonstrated, if you'll forgive me for stretching the analogy, a 'non-Euclidean reality.' Indeed, I do not use any postulates at all, but only the axioms of raw logic. The rules by which I have based my conclusions have been in place for too many years and have been verified too many different ways to be suspect. No, J.P., mathematics is alive and well; regrettably, there is simply no physical manifestation of the continuum it was meant to describe.

"What does it mean, you ask? What it means, in essence, is that nothing means anything. You and I, we are worse than a mere dream; we are a dream that nobody is having. A trick of the light, without the light.

"I can see that you do not believe what I claim; go study my work and convince yourself that I have not erred. We can talk more about it tomorrow." With this, Spindler waved vaguely towards the office door and focused his eyes back down to the papers on his desk. Sterra stood up and regarded the scholar contemplatively for a moment before backing silently out of the office. What rubbish, he thought to himself.

The sound of the raindrops pelted the wooden casket seemed almost deafening to the small crowd hovering around the newly-dug grave of J. P. Sterra, Ph.D. The sound began to grow distant as the mathematician's corpse descended into the earth. Spindler and Hoare turned away and spoke to each other as they wandered away from the great man's remains.

"You mentioned a note, Andy?" Spindler grunted sombrely. "Yeah, but I can't make anything of it. All it said was, 'Tell Erich he was right, signed, J. P. Sterra.' What did he mean, Spindler?"

"He didn't mean anything, Andy. He meant absolutely nothing, and I think that was the point."

Nobody of Any Significance

## Thought of the Term

What you don't know will hurt you! (next week)

# Grid Clues (Cryptic)



*Across*

1. didn't lose the base (5)
5. a sister has fifty ropes (5)
8. throw out from the east 104 shirts (5)
9. eight of mixed ace colts (5)
10. demand without moving (5)
11. a sage entertains (5)
12. man-made cloth (5)
15. chop the preferred recourse (5)
18. capture the offspring (3)
20. pull on imaginary creature (6)
21. in the document, surely? (5)
22. partially return the container (3)
24. church on island grows peppers (5)
27. nymph stays sober for years (5)
30. be anxious to x out directions (5)
31. a group of bats at church? (5)
32. marvel at a jungle (5)
33. five teens effect a strangeness (5)
34. err, alternatively make a mistake (5)
35. shirt rips at the lodge (5)

*Down*

1. mock the grade of the oaf (5)
2. speak in a taut terse sense (5)
3. wait, don't put it down yet (5)
4. small time (6)
5. guide the mixed but energetic remainder (5)
6. short scarf's wrap (5)
7. recently alter itself (5)
13. rotated centre of world (5)
14. royally take back beer (5)
16. senior scatters 50 deer (5)
17. dropsy; drop, see, say, spill ade on me (5)
18. animal sounds new (3)
19. not to pick a nit, but can it (3)
23. lover will win a shoe game (6)
24. telegraph news of the spoiled bleach (5)
25. bury in terra (5)
26. the alcohol confuses all there (5)
27. crude athlete is done in (5)
28. stay with the wrong direction of the fungus (5)
29. reside at Dutch spring (5)

1		2		3		4		5		6		7
				8								
9								10				
				11								
12	13		14					15	16		17	
						18		19				
20								21				
						22	23					
24		25		26				27		28		29
						30						
31								32				
						33						
34								35				

21. lump (6)
22. terms of payment (3)
24. donkey (5)
27. steam bath (5)
30. isolated place (5)
31. surrender cry (5)
32. egg-shaped (5)
33. ship (5)
34. correct (5)
35. product (5)

*Down*

1. toast (5)
2. stress (5)
3. poison (5)
4. super or shoe (6)
5. sound or coach (5)
6. object of quest (5)
7. doctrine (5)
13. grow (5)
14. musical instrument (5)
16. poisonous snake (5)
17. type of screw (5)
18. curve (3)
19. death (3)
23. oval or rectangle (6)
24. energy (5)
25. found in mollusks (5)
26. product (5)
27. baby deliverer (5)
28. habit (5)
29. improve (5)

# Grid Clues (Conventional)

*Across*

1. damp (5)
5. take aim (5)
8. group of eight (5)
9. typesetter (5)
10. repeat (5)
11. it's on the cake (5)
12. for the insurance? (5)
15. brilliant (5)
18. ripen (3)
20. peppery spice (6)

# THE STAFF

Curtis Jesudis Dale Wild

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Sharon Johnson

Ken Goldfarb

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Stuart Fink

Jeffrey Lane

BJ

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