THE "CANADIAN"

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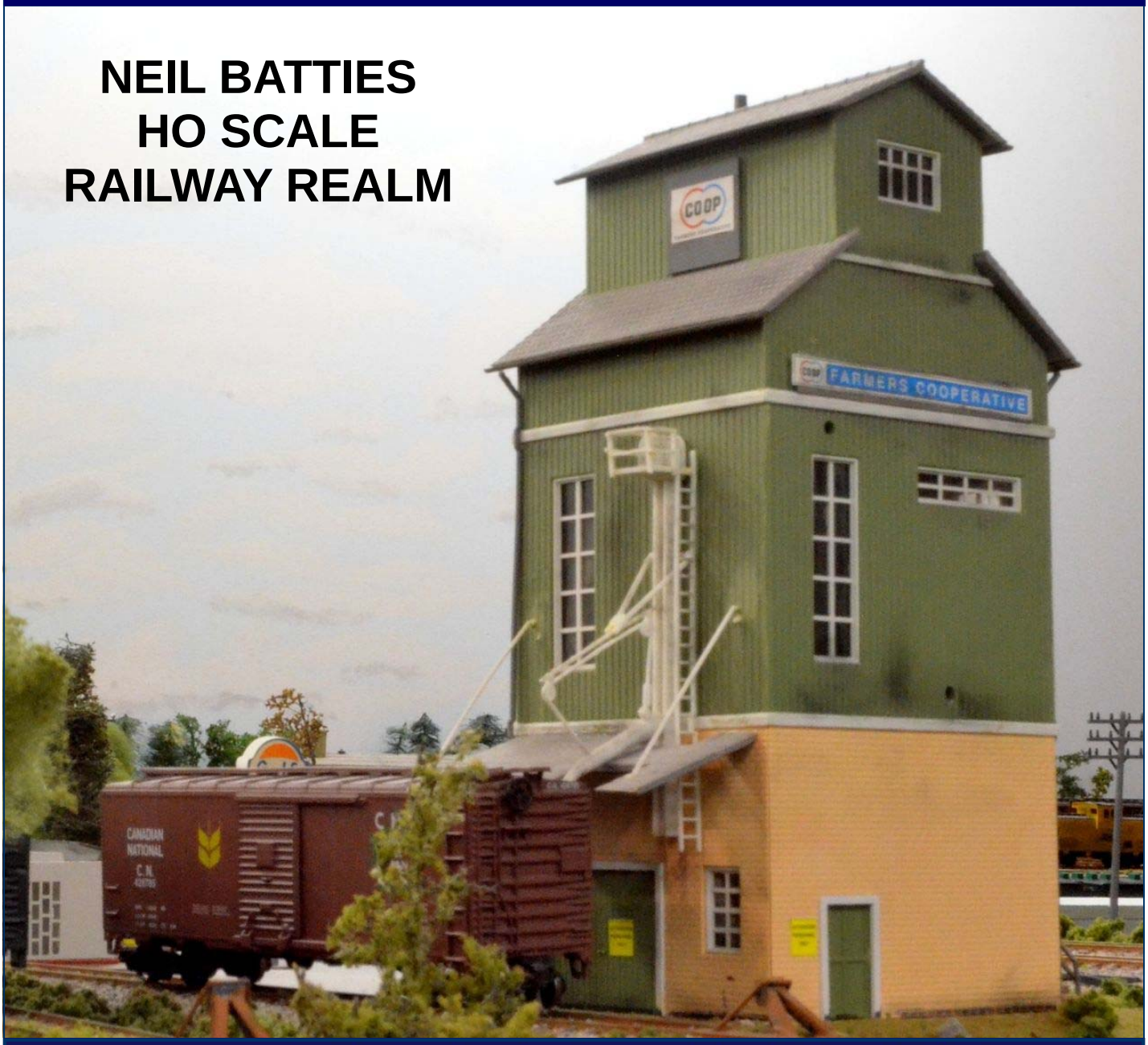
CANADIAN ASSOCIATION OF RAILWAY MODELLERS

SUMMER 2018 ISSUE #64

IN THIS ISSUE

NEIL BATTIES HO SCALE RAILWAY REALM



a quarterly publication of the "Canadian Association of Railway Modellers"

THE CANADIAN ASSOCIATION OF RAILWAY MODELLERS

Founded October 15, 2003
Founding Members: John Johnston, Peter Moffett, David King, Lex Parker

DIRECTORS

CHAIR	Gerald Harper	chair@caorm.org
VICE-CHAIR	Gary Baillargeon	vicechair@caorm.org
DIRECTOR AT LARGE	Peter Moffett	directorpete@caorm.org
DIRECTOR AT LARGE:	John Johnston	directorjohn@caorm.org
DIRECTOR AT LARGE	David King	directordavid@caorm.org
DIRECTOR ZONE 1:	Ian Macleod	zone1@caorm.org
DIRECTOR ZONE 2:	Ted Rafuse	zone2@caorm.org
DIRECTOR ZONE 3:	Vacant	
DIRECTOR ZONE 4:	Vacant	

OFFICERS

NEWSLETTER EDITOR	John Johnston	editor@caorm.org
SECRETARY/TREASURER	Peter Moffett	treasurer@caorm.org
WEBMASTER/CALENDAR	David King	webmaster@caorm.org
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MEMBERSHIP MANAGER:	David King	membership@caorm.org
CONVENTION REGISTRAR:	Walter Reid	registrar@caorm.org
PROMOTIONS MANAGER:	Steve Hoshel	promosteve@caorm.org
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FRONT COVER PHOTO BY TED RAFUSE: **Valley Farmer's Co-op on Neil Battie`s HO Railway Realm is located at the offshoot of one of the corners of the oval. As the name implies it is located in a rural setting and provides many agricultural seed and fertilizer supplies to local farmers as well as grain storage at harvest time and over the winter. It is a busy rail site.**

MEMBERS AREA PASSWORD

USERNAME: gondola
PASSWORD: hopper

Material for the Canadian should be sent to:

John Johnston
41 Glenview Place,
Hamilton, Ontario, L9C 6H9
or by
e-mail at editor@caorm.org

MEMBERSHIP REPORT

Over the early part of this year we have been working to bring all of your memberships up to date. We have been moving all of the membership records to a new format as the previous method was becoming difficult to manage. The memberships are all now in the new format and we are progressing on the next step of getting all of our members renewed. The Board has been supporting expired memberships, but it is now time for all of us to do our part so that we can remain in the favourable financial position that we have been in since the very beginnings of CARM.

Within the near future everyone that has a membership expiring by September 30th, 2018 should have received a renewal notice. By email if you have an active email address on file with us or a by letter if we don't have a valid email on file. To renew your membership, you have three options on the type of membership.

Option 1 is a General Membership for a term of 1 or 3 years. Each year of a General Membership includes 4 printed issues of *The Canadian* and a CARM Calendar. These publications are mailed to you by Canada Post. The cost for a 1 year membership is $36 and a 3 year membership is $103. A General Membership includes full access to the website.

Option 2 is an Internet with Calendar Membership. This membership includes an emailed PDF of the Canadian and a printed CARM Calendar mailed to you by Canada Post and full access to the website. This is available as a 1 year membership for $10 or a 3 Year membership for $30.

Option 3 is an Internet Only Membership. This membership includes an emailed PDF of the Canadian and that allows you full access to the website. This is the most economical membership in that the cost is $0, FREE. Just in case you were wondering all of the past issues of *The Canadian* are available in the members area of the website, and all of the downloads are free.

New Memberships or Membership Renewals can be completed on the website using either the online form or you can download and print out the PDF renewal form. Payments can be made online using PayPal or by mailing in a cheque. We can accept Canadian or U.S. payments but please only use U.S. funds if you are not in Canada. Sorry but we can't accept any credit or debit cards and we can only accept cash in person.

All of these rates are the current rates for 2018 and the Executive looks at these prices each year to make sure that we can continue to operate and supply the membership with a cost effective product/service. As members you can contribute by supplying some of your knowledge through articles, clinics and tips that can be published in *The Canadian* or on the website. You could also help to organize a local meeting or event for others to attend and participate in. One of the simplest things you can do as a member would be to invite others to join CARM and we can all benefit from some socializing and common sharing of knowledge.

Let me talk about Chapters for a moment. We have Chapters which are active and a number of Chapters which have gone inactive. There are things you can do to help CARM to improve Chapters. We have a new form on the website where I encourage all of you to sign up to receive information on any of CARM's Chapters. You are not limited to just having yourself included in a local Chapter anymore. What this means is that you can belong to multiple Chapters.

The president of the Chapter will be able contact you about events, meets or other chapter information but no advertising from any other organizations or companies will be included unless it is tied directly to a CARM event.

This new approach to Chapters will allow us to add future Chapters to CARM where geography is not a factor. These types of Chapters would be based on a scale, gauge, DCC or some other factor that would be of interest to a number of members. This also opens up the possibility for you as a member to contribute as someone that would be willing to help organize or prompt one or more Chapters. It's something to think about.

When you look for this new Chapter form be sure to check out the website for the Chapter menus and fill your form out. Also, be sure to send me an email if you have a question regarding your membership status and I will get back to you about it even if it takes me a few days. I, like the rest of the people in CARM are volunteers so we may need to take a few days to get back to as real life keeps getting in the way of us having fun sometimes.

Thanks, and keep on the right track.

David King
membership@caorm.org

Chairman's Report

April is now history as I sit down to write this message and that means that most of the model railroad shows have been and gone for another season. However that didn't mean to say that there were no shows in May and in fact one involved a lot of effort on my part. Toronto has a festival on the last weekend in May every year called "Doors Open Toronto" during which many of Toronto's finest buildings, historic and cultural features open their doors to the public to find out more about them. The Toronto Roundhouse Museum is one of the organizations that participates in this event and they invite modelers with portable model railroads to display their layouts for the weekend. I was lucky enough to be chosen to display my Anyox Railroad and so was under considerable pressure to get it finished and in top notch operating condition for the display. I am pleased to say that it was a very successful weekend with a large crowd of visitors, right up to the closing minutes of each day. It was so nice to see the enthusiastic faces of children watching and encouraging them to ask all their questions.

One of the added bonuses of being at the Roundhouse was being able to catch up on their plans for restorative work on their considerable fleet of locomotives, coaches, freight equipment and ancillary items. I was pleased to learn that a tiny little 0-4-0 two foot gauge compressed air locomotive that I had last seen languishing outside Merrilees yard on Old Weston Road, Etobicoke, many years ago had been acquired and well restored.

Visiting our railroad museums around the country is an excellent way to provide additional information for adding modeling details to our layouts. At the same time it also provides the museum volunteers with the pleasure of talking with someone who knows a lot about trains. If it also stimulates you too volunteer to help those museums in the future that is a wonderful outcome.

My Anyox Railroad will be seen again this summer by the delegates to the National Narrow Gauge Convention in Minneapolis at the beginning of September and then maybe I have a little bit of spare time to finish writing the last one or two more installments of my story about its construction. Writing an article about your model railroad construction project is not difficult and is very much appreciated by many readers. The most important thin to remember to do is to take photographs along the way during the construction, when it is incomplete, when it is unpainted, when it has no roof etc. Once it is all assembled it is very difficult to go backwards to get the picture you need once you start writing the article. With digital cameras it is always better to over photograph rather than under record. Even video footage is useful to show assembly or disassembly of tricky bits. Our CARM website readily hosts video footage and we are always looking for interesting material. So take some images and then write some captions for the ones that best explain your project, then take the captions and string them together and you will find you have largely written your article.

Have a good summer and if you do manage to get to a railroad museum, and there are many across this continent, take lots of photos and get some new ideas for your modeling projects.

Gerald Harper, Chair, CARM

PUBLICATION SCHEDULE FOR *THE CANADIAN*

***The Canadian* is published four times per year. Submission by authors or Chapters should be submitted by the following dates.**

Spring Issue: February 1 Summer Issue: May 1
Fall Issue: August 1 Winter Issue: November 1

Chapter Reports

NATIONAL CAPITAL CHAPTER

The National Capital chapter recently enjoyed an excursion to the Brantford, Simcoe and Port Dover layout tour. After an unusually long drive, we checked into our motel and rushed out to join Susan and Lex Parker for supper, after which we were treated to a personal tour of Lex's layout. That was a truly spectacular experience, and the NCC wishes to thank Lex and his wife for their hospitality.

The next day was the tour proper and we started in Port Dover. Gord King was the first on the list, followed by the Fast Tracks facility and a tour of the Mt Albert shop, provided by Gerry Cornwell himself.

On to a couple of highly detailed layouts in Simcoe, a jaunt to see the beginnings of a layout in Delhi, and then we got to see Ted Black's excellent multideck layout with three helix. On to Roger Chrysler's layout, the Lake Erie and Northern. This is a close representation of the line and all structures were scratch built. We took in another recently relocated layout, a nicely detailed HO layout and a small but delightful N scale layout. We finished the tour at the Brantford club and retired for a well earned meal.

While the chapter attendance was somewhat limited, due to family commitments of many members, the participants enjoyed themselves immensely.

Next excursion will be a bit closer to home, though.

TWO PHOTOS ABOVE: GORD KING LAYOUT
PHOTOS LEFT AND BELOW: ROGER CHRYSLER LAYOUT

Canadian Association of Railroad Modellers – Ontario Midwestern Chapter

Annual Spring Meeting - Minutes April 29, 2018 April 30, 2018

location: Home of Paul Korhonen

present:: Graydon Hancock, Steve Hoshel, Judith King, Paul Korhonen, Dolf Roelofsen, Randy Schnarr.

regrets: Walt Annett, Lloyd Koch, Robert McKinlay, Mike Pickup, Craig Symington.

Steve opened with a welcome to all,

1 **Approvals:** Agenda, Prior Meeting Minutes and Financial Statement. No changes required. Moved by Dolf

2 **Membership:** Discussion on membership centered around the "free year". Steve described the levels of

3 **Promoting the Hobby:** (model railroad venues to engage)

May 5: .....Nottawasaga Train Auction, 215 Pine St, Stayner, Ontario. View 8:30, Auction Starts 10:30.
May 12: .....County Line Caboose Garage Sale 8:00 - 12:00 noon. Elmwood Ontario.
July 11 .....Bruce County Museum Railway ...opening event at 7:00 PM
July 14-15: ... Owen Sound Waterfront Festival - Marine Rail Heritage Museum.
July 21: .....Mount Forest Fireworks Festival.
Aug 17-18-19: .Bruce County Steam Heritage Festival, Paisley, Ont
Sept 15: ..... Grey Central Model Train Show. Holland Center. CARM-OMW manages cash at the gate.
20-Oct .....Capital Region Layout tour ...and group meet opportunity.

4 **Project Challenge/ Items of interest:**

- Steve showed his model truck with prototype corrected wheels.
- Dolf explained issues surrounding his efforts to do live video for the BCMR project.
- Paul donated Caspia & Scenic Express super trees to BCMR project. Steve explained how to use them.

5 **Other Business:**

- How to Use our funds: We agreed to fund 50% of the purchase of a CARM shirt from the CARM store for MWO members. To buy your shirt, go to the CARM site > About us > Store. Shirt sizes are accurate. Send or e-mail your receipt to me (Randy) and I'll forward a cheque for half the cost.

- Membership Renewal: Our group does not readily know whether they are paid up or not. To resolve the confusion and keep administration simple, we agreed to pay by January 1st of each year, whether we are late or early vs the central listing. We want a single common renewal date that we can remember. As Secretary Treasurer, I will send out a renewal form in December ...a great Christmas Gift idea.

- Ottawa Layout Tour: Good idea as long as we have an opportunity to meet and greet all participants at a common meeting spot ...possibly a restaurant with a separate room. Sunday morning would be good.

- BCMR (Bruce County Museum Railway)Update: Progressing well. Major focus is now on electronic controls for automatic operation. Opening ceremony is July 11 at 7:00 PM.

minutes by Randy Schnarr

REBUILDING THE WESTON SUB PART 3

ARTICLE AND PHOTOS BY WILLIAM WAITHE

Introduction:

In parts one (*The Canadian Issue # 57, p9*) and two (*# 59, p.18*), I described the building of a new version of the CN Weston Subdivision Layout. The CN Weston sub is a proto-freelance, industrial switching layout based on the CN Halton and Weston subdivisions in Toronto in the late 1980s. In this, the final installment, I will describe the testing and correction of tracks and turnouts, the construction of scenery, the buildings, some adaptations to the rolling stock and the development of the operating system. The work is being done with the help of Bill O'Shea, Keith Martel, James Rasor and the new members of the group, Mark Earley and Terry Danyleyko.

Track and turnouts:

Track free from defects is critical for an operating layout. We therefore held some preliminary operating sessions to detect and correct any flaws. We found some uneven areas on the main track, with some depressions serious enough to cause un-coupling of cars. These areas were near or between turnouts and were found to be due to insufficient support of the track where cut-outs were made in the extruded styrofoam base to accommodate the servo motors and their wood supports. To correct the defects, ballast was removed by a brief application of water containing a few drops of liquid dish detergent. The track and turnouts, having been attached with latex caulking, were easily lifted and shims inserted under the track. Supplemental supports for the corresponding turnouts were made by gluing styrofoam pieces from underneath the layout **(PHOTO 1).**


PHOTO 1

In addition to the uneven track, some of the Micro Engineering turnouts which had a manufacturing defect (see Part 2 of this series) required more filing of the stock rails to get them into gauge. Minor adjustments to the tuning of the servos controlling the range of the point movements were also made using the Berritt-Hill programming device described in Part 2.

Scenery and buildings:

In addition to other work on the layout, about 15 to 20 percent of the scenery has been accomplished over the past year. Although this might seem like a slow pace, now that the track work and wiring is finished, we can expect a more rapid pace in completing the placement of buildings and landscaping.

Landforms: Although the area of the Weston and Halton subdivisions is mostly urban and flat, there are some variations in ground height (and some have been added for aesthetic reasons, (the "*freelance*" part). Landforms are made with varying thickness of extruded styrofoam layers attached to the layout with Weldbond or No More Nails adhesive. In some cases, Woodland Scenics plaster cloth was draped over the Styrofoam and left to dry and then covered with a coat of Pollyfilla spackling material which had been reconstituted with water tinted with black or earth-coloured tempera powder (**PHOTO 2, PHOTO 3, PHOTO 4)**


PHOTO 2

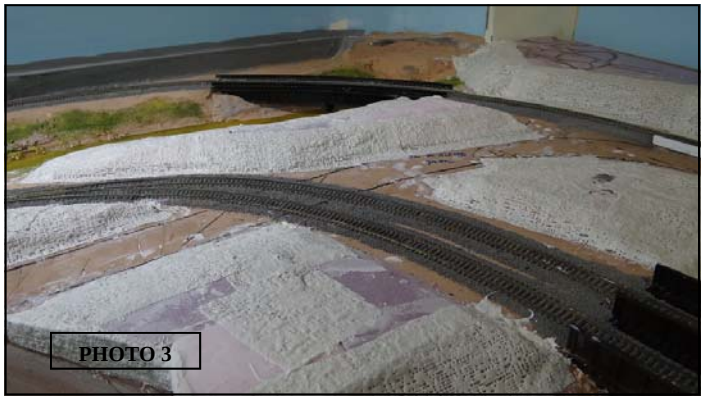
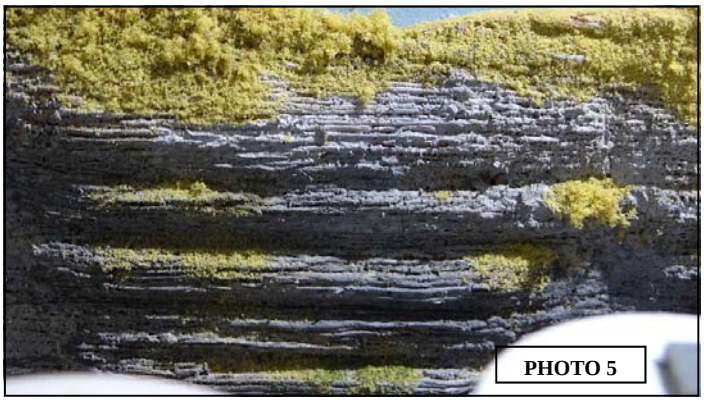


PHOTO 3

Colouring the Pollyfilla paste prevents the inevitable chip due to wear and tear in the landscape from showing as a white patch. Care was taken to mix the colours under the appropriate lighting, although most of the layout lighting was by daylight intensity LEDs, the peninsula was illuminated by daylight fluorescent fixtures. To simulate rock surfaces, while the Pollyfilla paste surface was partly dry it was striated with a stiff brush and then painted. In other cases, the bare styrofoam surface was striated with a wire brush and then painted (**PHOTO 5**). Paints for ground cover or rocks were made by mixing flat white latex paint with various tempera powders.



Trees, Grass and Bushes: The layout represents summer foliage in Toronto and is based on photographs of the modelled industrial areas taken in June. Simulation of flora was by standard methods, mostly with Woodland Scenics ground foam of various colours and textures.

Tree armatures were made from twigs suitable for N scale trees harvested in fall or winter from local bushes. They were soaked for at least four to six weeks in a 50/50 mixture of isopropyl alcohol and glycerol tinted with green Tintex dye. This preparation results in twigs which remain flexible when dried. The dried twigs were dipped in a 50/50 mixture of white carpenters glue and water with a few drops of liquid dish detergent and ground foam (clumps and powder) was added (**PHOTO 6**)

An elevated urban scene was built over tracks in one section. To allow for access to the track below an access hatch was incorporated into the street (**PHOTO 7, PHOTO 8, PHOTO 9.**).

Roads and grade crossings: The roads in the industrial areas of Rexdale and Etobicoke North are usually ash-

phalt, two lane roads, most without lane markings or sidewalks (**PHOTO 10**).


PHOTO 10

The layout streets are outlined on the layout surface using a scale 22 foot wide gauge and then painted. Level grade crossings are made by spreading Pollyfilla paste across the rails. After the material is partly dry, a used locomotive truck with deep flanges is passed a few times over the crossing to clear a path for the rolling stock wheels. After the material is completely dry, the contours and edges are sanded and the crossing is then painted with the road colour (**PHOTO 11**).


PHOTO 11

Buildings: Buildings are glued directly onto the styrofoam layout base or, when to be removable, are fixed in place by cementing a block of styrofoam of appropriate size with Weldbond .An opening in the styrene base of the building of the corresponding dimension holds the building in place and allows for easy removal (**PHOTO 12**). For paved areas around buildings, cement or asphalt was simulated with 2 mm styrene sheet (**PHOTO 13**) or 1/8 inch hardboard painted the appropriate colour (**PHOTO 14**).


PHOTO 12

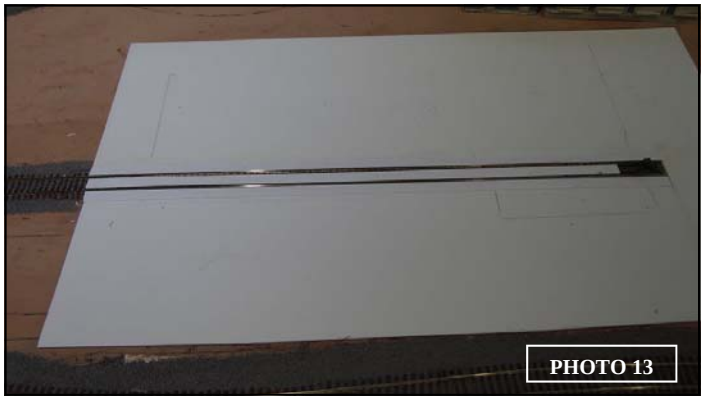


PHOTO 13


PHOTO 14

Most of the buildings were salvaged from the original layout, however James Rasor, a professional architect, is


PHOTO 15


PHOTO 16

making some new buildings built to a much better level of detail (**PHOTO 15, PHOTO 16**).

Rolling stock:

Body-mounted couplers: The cars are all equipped with metal (MicroTrains 36 inch wheels). To insure better tracking, all of the rolling stock (145 freight cars) was converted from truck-mounted to body-mounted couplers. In most cases, James Rasor carefully cut off the couplers from the Micro Trains trucks and mounted them on the car bodies. Micro Train universal body mount couplers were purchased and used in a few cases.

Car numbers: As has been often noted, one problem of operations in N scale is the small size of the car numbers which makes identifying cars difficult. Since we operate with switch lists, being able to identify individual freight cars is necessary. Furthermore, the relatively close track spacing we use in the yards (3 cm. center to center) looks more realistic but makes reading the numbers on the side of cars difficult. Keith Martel therefore placed larger numbers on the roof of the cars using dry-transfer decals (**PHOTO 17**). Some cars I recently purchased already had numbers on the roofs so the practice seems to exist in the prototype.

PHOTO 17

Some new loads: Additional loads for new gondolas and hoppers were built. A piece of styrene sheet was cut to fit in the car, painted black or grey and a load glued on the surface. Loads are made of aluminum foil to simulate scrap metal or granular material (ballast or used Brita filter resin) to simulate stone or aggregate. For easy placing or removal of loads during operations a piece of paper clip or a small rare earth magnet is incorporated within the load and a magnet on an extensible wand is used to remove or place the load during operations while the car is on the track. (**PHOTO 18**).

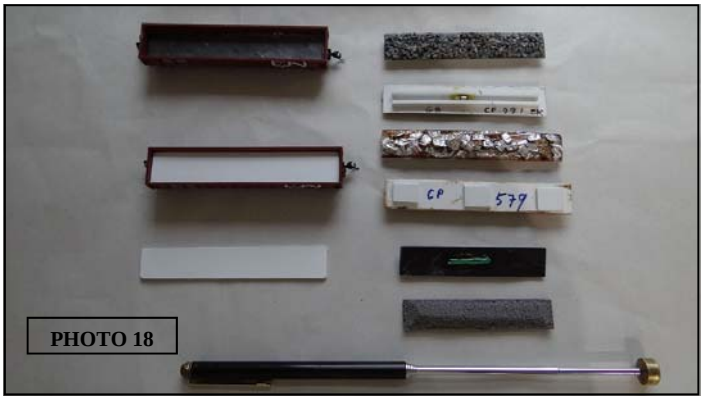


PHOTO 18

Weighting the cars: We had increased the weight of the rolling stock to improve stability beyond the NMRA standards. The cars are weighted to 40 gms. independent of length. We plan to test increasing this to 60 gms. As there are no grades on the layout (the old layout had a 2 % grade), The increased weight should not pose a problem for a locomotive to pull a 14 or 20 car train on level ground. The aim of increasing the weight is to minimize derailments. However, it has been my experience that most derailments, apart from track defects, are the result of operator errors (overspeed on turnouts, running over non-aligned turnouts, shirt sleeves etc.)

Operations:

The track plan and the industries are shown in **PHOTO 19**. There are two train types: Two turns, or way freights, each serve a different group of industries. They are designated as L 500 series, following CN practice. Transfer trains (the K 500 series) carry required loads or empties from the Lambton interchange yard to the classification yard where trains are assembled for the industries, or to the storage yard if not immediately needed, and the reverse route carries loads or empties from the industries from MacMillan yard to the interchange. The interchange is where traffic originates and ends on the layout. The actual route from the MacMillan yard to the CP interchange at The Junction is about 37 Km. (23 miles) long. This is compressed about 7-fold on the layout to 3 scale miles. No staging is needed as there are no through trains modelled and operations are self-contained. If sufficient operators are present, RDCs are included in the train schedules with stops at 5 stations along the route.

The road names and areas of the layout are chosen from a map of the route and correspond roughly to the geographical locations of the real areas and roads along the Halton and Weston subdivisions from the Macmillan yard to the Junction (the CP Lambton yard). Although the number of rail-served industries has decreased from year to year since I began the original CN Weston sub, CN still serves industries in the Weston and Rexdale areas with one daily way freight which interchanges with the CP as indicated in the track plan.

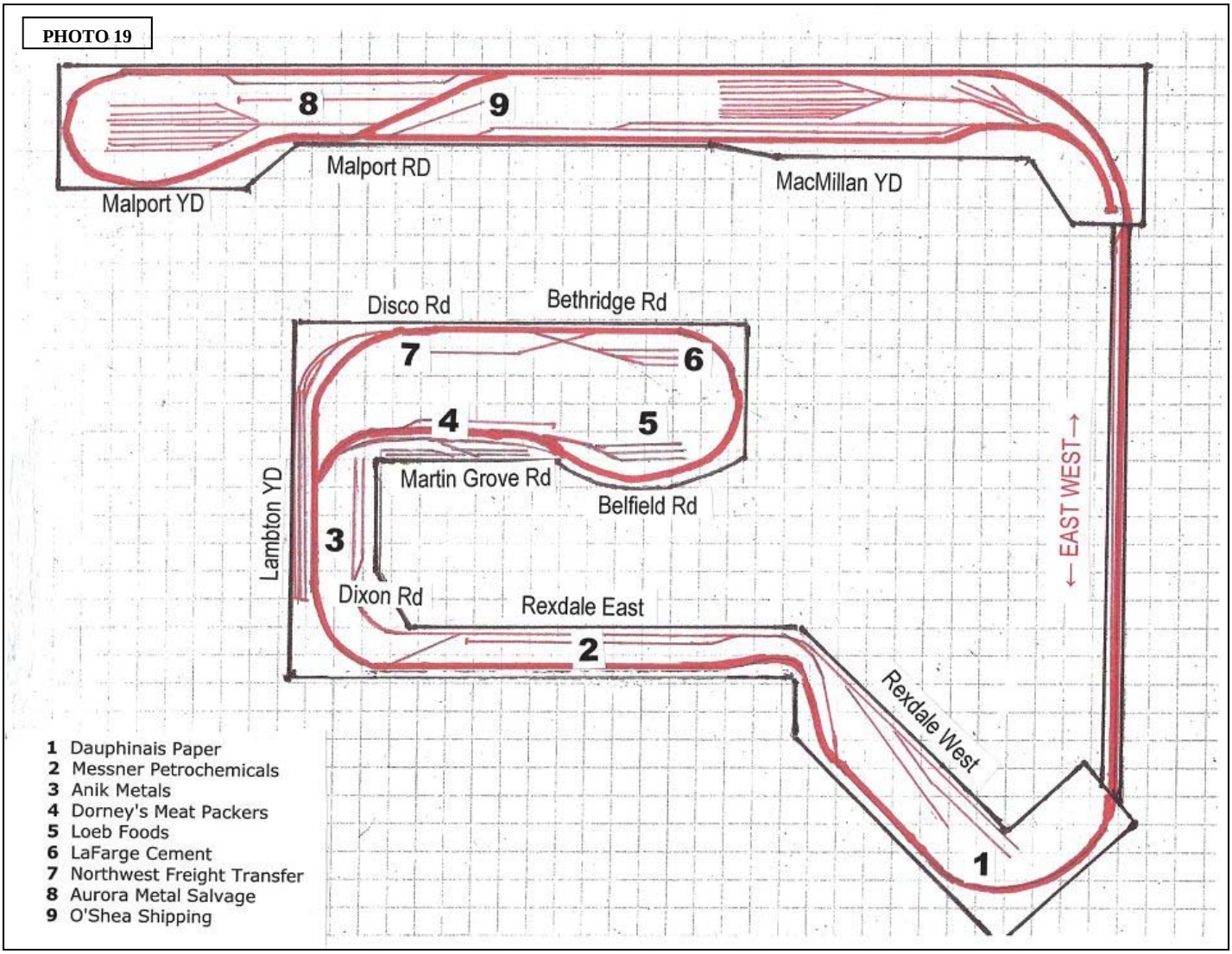
I have been using Ship It (Albion Software) for the past 15 years for my operating system and have found it to be ideal for my purposes. The program generates train lines and switch lists and is based on the “real” needs of the industries determined by the data provided by the user. Although it may take time to establish the database and to develop a balanced system, once this is done, the program pretty much runs itself. I am now making changes to improve operations. The train schedules at present require that a train may have to wait until another train has returned from the industries or the interchange with cars necessary for that first train to depart. I am therefore modifying the schedules to allow for parallel schedules that will serve the industries.

(*The work described here covers the period from February 2017 to January 2018*).

Acknowledgements:

I could not have undertaken the building of this layout without the aid of Bill O'Shea and Keith Martel. Bill and Keith have been working with me for the past 17 or so years. James Rasor joined us about one year ago to work on the new layout and more recently, Mark Earley and Terry Danyleyko have joined the group and are eagerly learning and contributing to the progress of building the layout. I also appreciate that my wife, Christiane, accepts my absence for the long periods of each day that I spend in the "Train Room".

PHOTO 19



MODEL RAILWAY ANIMATION PART 4: LCD DISPLAYS

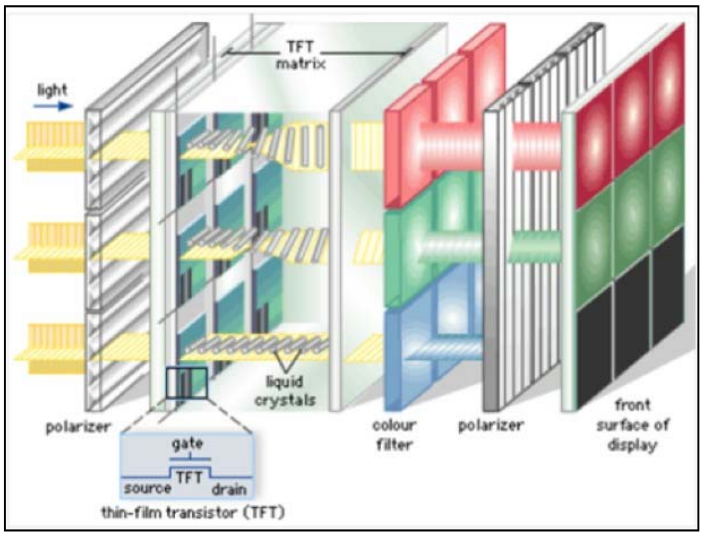
Text & Images by David King

Welcome to the next instalment of this series as we build on what we learned in the previous lessons and now we will add some LCD displays. This time we will have a look at giving us some visual feedback or information using liquid crystal displays, LCDs. A basic 2x16 LCD display was included in the Arduino and SparkFun kits and for the kit from Adafruit is was available as an extra item that could be ordered. All of the remaining parts needed complete the projects in this article should already be in your kit.

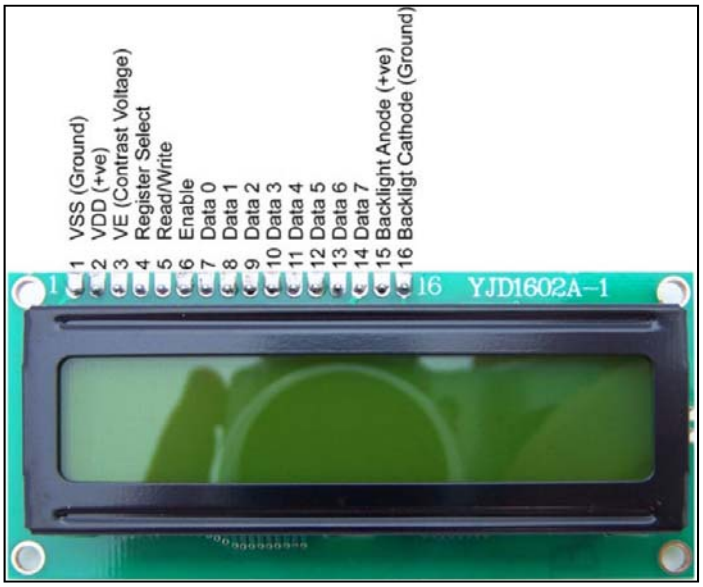
LCD Displays

Before we get too far into this topic we need to understand what a LCD is and how it works. LCDs are electronic flat displays that allow us to manipulate the light passing properties of liquid crystals. LCDs themselves do not produce light so they are best viewed when a backlight is used. We can alter the light passing properties to either light pass or block the light. LCD screens come in a wide variety of sizes and have been used to replace cathode ray tube, CRT, and plasma screens as they are more energy efficient and lighter for a given size. Only recently has LED screens been replacing LCD screens.

In the constriction of a LCD we can see that a light source is used and the light is passed through a polarizing filter. Then a small voltage is applied to 2 plates of the TFT and this causes the crystals to twist to allow the light to be passed through a second polarized filter that is 90 degrees in alignment with the first filter. The light is also passed through a colour filter if needed to produce a particular colour.



Once we get by the construction and the inner workings of a LCD we can look at our LCD. The basic LCD display, 16x2, that we will be using is one of the most common and lowest costs displays that are available. Other sizes of displays are available such as a 20x4 sized display. The 16 or 20 represents the number of characters on each row and the 2 or 4 lets us know how rows of text will be displayed. It is important to know how the 16 connection pins are used with the Arduino UNO.



As can be seen this display has 16 connections but we don't need to connect all of pins to use it. We will be using 12 of the connections and leaving 4 unconnected. The simplest are the connections for the backlight. To enable the backlight pin 16 is connected to ground and pin 15 is connected to a 220, 330 or 560 ohm resistor depending on which one came with your kit and the other end of the resistor is connected to +5 volts. The backlight will be active whenever power is connected to the Arduino UNO.

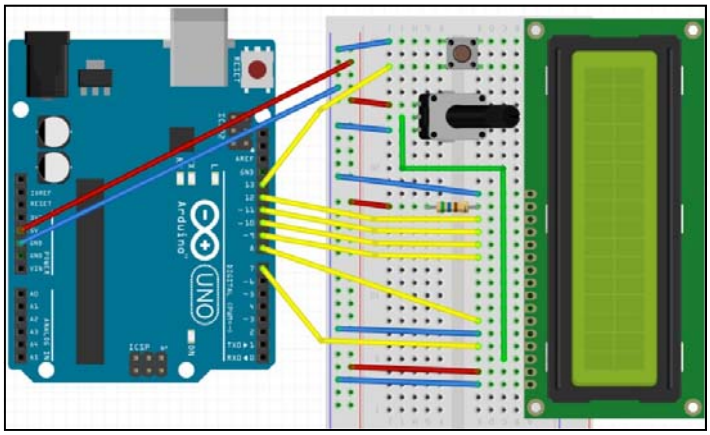
Wiring up the LCD

Pin 1 and pin 5 are also connected to ground. A +5 volt connection is made to pin 2. Pin 4 is connected to the center pin of a potentiometer with the other pins of the

potentiometer connected to ground and +5 volts. The potentiometer will allow us to adjust the contrast of the text on the LCD screen.

Pin 4, 6, 11, 12, 13 and 14 are connected to the Arduino UNO pins 7, 8, 9, 10, 11 and 12 in the order. All of the communications and controls that are being sent to the display are done so through these connections. Pins 7, 8, 9 and 10 on the LCD are not connected as we will not need these.

Finally pin 13 from the Arduino UNO is connected to a pushbutton and the other side of the pushbutton is connected to ground. Display below is a Fritzing image showing all of the connections.



Creating a Simple Sketch

Most of the books about using a LCD display for the first time use a sketch called “Hello World” and we will do the same here as it shows us the basic setup and use of the display. The sketch itself is not complex so let’s begin coding once you follow the wiring diagram to get ready for the code.

In the sketch we need to include the code required for the LCD driver. This is done on rung 6. The file LiquidCrystal.h is included in the default library files that were installed as part of your basic kit. If for some reason you are missing this file go to the arduino.cc website and download the library file from their site.

```
// Hello_World.io by David King
// This sketch is used to display a simple message
// and test the LCD.

// include any associated files in this location
#include <LiquidCrystal.h>

// declare any variables needed in you file here

LiquidCrystal lcd(7, 8, 9, 10, 11, 12); // Set up the LCD

void setup() {
  // put your setup code here, to run once:

  lcd.begin(16, 2);   // Start up the LCD
}

void loop() {
  lcd.setCursor(0, 0);  //  Set the cursor position
  lcd.print("Hello World!");  // Display the message
  delay(500);
  lcd.setCursor(0, 1);  // Set the cursor position
  lcd.print("from David");  // Display the message
  delay(1000);
  lcd.clear();  // Clear everything on the display
  delay(500);
}
```

#include <LiquidCrystal.h>

Next, we declare the pinouts used for the LCD display using the code from rung 10.

LiquidCrystal lcd(7, 8, 9, 10, 11, 12); // Set up the LCD

Inside of the void setup() we no initiate the LCD by setting the display size and telling the LCD to start communicating. We do this by adding the code from rung 15.

lcd.begin(16, 2);   // Start up the LCD

All that is left at this point is to add basic code to void loop() of the sketch. Here we can set the cursor position, print information on the display and clear everything from the display area causing it to be blank.

After you have uploaded your sketch to the Uno have a look at the display to see the results. If the screen is not readable, try adjusting the contrast of the characters as compared to the background of the display. This can be done by adjusting the potentiometer that we installed while following the wiring diagram.

There are some other commands that can also be used with the LCD unit. Give some of these a try and see what you can do with the display. the full list and the explanations for each is located in the libraries located in the reference section of the Arduino web site.

LiquidCrystal()	begin()
clear()	home()
setCursor()	write()
print()	cursor()
noCursor()	blink()
noBlink()	display()
noDisplay()	scrollDisplayLeft()
scrollDisplayRight()	autoscroll()
noAutoscroll()	leftToRight()
rightToLeft()	createChar()

Magic 8-Ball

If you want to expand a little on using the display let's create a Magic 8-Ball, The Mystic Ball, The Mysterious Cube or one of the other fancy gaming objects that are used to give you an answer to your question by simply pressing a button the foretelling object. To complete this sketch you will need use the pushbutton that was included in the wiring diagram. Here is the code to help you along. Be sure to read the comments in the code and work your way through the code. Pay close attention to the switch/case instructions on rungs 43 – 68. This uses the number generated by the random number generator on rung 37 and returns a number from 0 to 7.

Conclusion

```
// LCD_Eight_Ball.io by David King
// This sketch is used to create the Mystical 8 Ball.
// Here a random number is selected and the result is displayed
// on the LCD.

// include any associated files in this location
#include <LiquidCrystal.h>

// declare any variables needed in you file here

LiquidCrystal lcd(7, 8, 9, 10, 11, 12); // Set up the LCD

const int switchPin = 6; // Used for selecting an answer
int switchState = 0;
int prevSwitchState = 0;
int reply;
const int backLightPin = 13;  // Used to enable the LCD backlight

void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600); // Start up the serial monitor
  lcd.begin(16, 2);   // Start up the LCD
  pinMode(switchPin, INPUT_PULLUP); // Set the selcection button
  pinMode(backLightPin, OUTPUT);    // Set the backlight enable
  digitalWrite(backLightPin, HIGH); // Enable the backlight
  lcd.print("Ask the"); // Set up the initial display
  lcd.setCursor(0, 1);
  lcd.print("Eight Ball!");
  randomSeed(analogRead(5));  // Randomize the random number
}

void loop() {
  switchState = digitalRead(switchPin); // get the state of the PB

  if (switchState != prevSwitchState) { // check for a change of state
    if (switchState == LOW) { // check for a LOW state (pressed)
      reply = random(8);  // random number generator
      lcd.clear();  // clear the display
      lcd.setCursor(0, 0);  // move the curser to the start of the LCD
      lcd.print("The ball says:");  // put this on the 1st line
      lcd.setCursor(0, 1);  // move to the start of the second line

       switch(reply) { // use the switch function to display the answer
         case 0:
         lcd.print("Yes");
         break;
         case 1:
         lcd.print("Most Likely");
         break;
         case 2:
         lcd.print("Certainly");
         break;
         case 3:
         lcd.print("Outlook Good");
         break;
         case 4:
         lcd.print("Unsure");
         break;
         case 5:
         lcd.print("Ask Again");
         break;
         case 6:
         lcd.print("Doubtful");
         break;
         case 7:
         lcd.print("No");
         break;
       }
    }
  }
  Serial.print("Switch State: ");
  Serial.print(switchState);
  Serial.print("Case: ");
  Serial.println(reply);
  prevSwitchState = switchState; // change the state of the PB input
}

```

As we have seen from this article it is possible to add a display to your projects so that you and others can interact with information provided at your layout. If you what to learn more and try to build a speed monitor for your train layout, the kind that lets you know how many scale miles per hour you train is moving through a section of track, be sure to go to CARM website in the member section and check out the expanded article.

I'm not sure what topic I will cover in the next instalment of this series and you could help me out with your ideas. Drop me a note, email, addressed to directordavid@caorm.org or membership@caorm.org as I would like to hear from you.

This is a project that you can start at any time even if you have not viewed the previous articles from this series. The previous articles are available in the preceding issues (#59, #60, #61 and #62) of *The Canadian*, so enjoy!

Neil Battie's HO Scale Railway Realm

Text & Images by Ted Rafuse

Neil Battie began model railroading naturally, almost by osmosis. When he was a child his father worked in CPR's Montreal Angus Shops. Somewhat rare at that time his father also had an S-scale American Flyer operating model train layout. Consequently, Neil from a very young age, was aware of the fascination of model railroading. This combination resulted in Neil entering the hobby with two important caveats both of which have played a part in his subsequent modelling.

It was not until 1988 however that circumstances allowed Neil to enter the hobby entirely on his own. That first layout featured both Canadian National and Canadian Pacific examples of locomotives and rolling stock and the time frame was that of the 1960's and 1970's. It was a 12 by 20 foot layout and well developed.

He has relocated to central Ontario and a new house provided an opportunity for a new basement layout. The current layout is simple in design and simple to operate alone or with a crew. There are no elevations in the track, the track is laid on flat plywood. The track plan is a large extended oval with a centre peninsula featuring a significant stub end passenger terminal and yard. Off one curve of the oval is a second feature, a large industrial and open staging or freight yard. There is a lift out track section at the bottom of the oval that allows access to the centre of the oval from where train operations occur.

The layout operates by DC electrical feeds to the track with multiple isolated electrical blocks, allowing several trains to be operated on the layout simultaneously. Track is nickel steel code 100 flex track, turnouts are Atlas #4

The image above illustrates the layouts three legs. In the foreground is the approach to East Falls with the dome-observation car Kokanee Park on the tail end of The Canadian. On the peninsula are the multiple cement storage silos and the dual passenger yards and station and several smaller industrial sites. On the far wall is the pond area, the R.J. Frost Ice and Storage Company, and attached to the layout is the

Photo above: When Neil's family lived in Clarkson, his father was employed by the British American refinery. B/A no longer exists, and Clarkson is part of Mississauga. Neil`s refinery remembers those days.

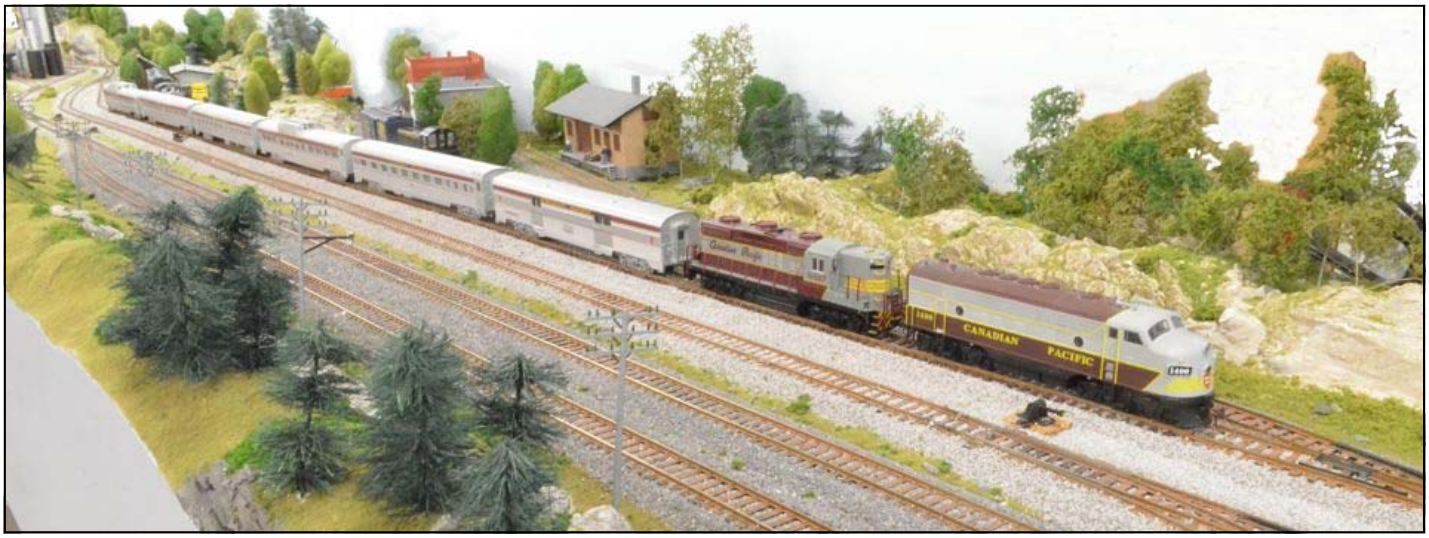


Photo above: Illustrates one side of the layout oval with the six car Canadian stretched along tangent track. In the background at the left several towers of the B/A refinery are barely visible. Different colour ballast denotes mainline and passing/spur tracks.

and #6, the latter employed on the mainline and the former on industrial and manufacturing spurs. To enhance operator involvement all turnouts are operated by Caboose Hobbies ground throws. When operating the layout alone, Neil maintains a train running on the mainline loop while he shunts and switches in industrial and yard areas.

Track power is supplied by three Tech II throttles and one Spectrum throttle. Locomotives are a combination of manufacturers including Proto 2000, Kato and Atlas models. Passenger cars are IHC models. Freight cars from diverse model manufacturers are located at many locations on the layout. The railway realm is generic in name but features primarily CN and CP locomotives with one TH&B switcher interloper.

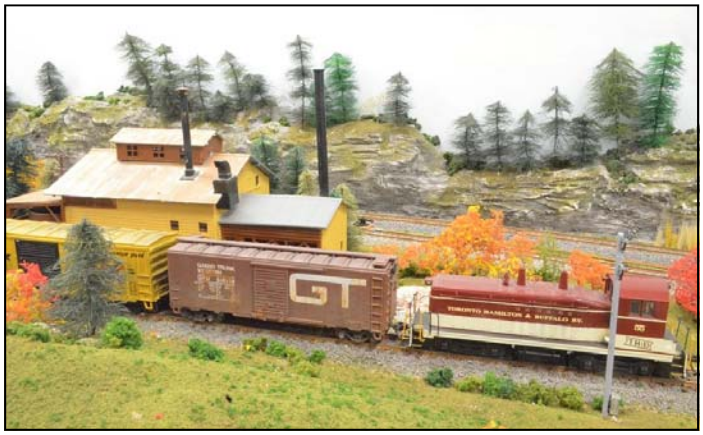


Photo Above: A TH&B switcher positions several box cars beside the January Molasses Refinery named after the owner Moses January. Unrefined raw sugar is delivered in covered hoppers and the refined molasses in cartons are shipped out inbox cars to grocery distributing warehouses. The buildings were purchased used at a train show.

Structures are varied: some are out of the box Walther's kits, some are used buildings purchased at model train shows. Topography consists of crumpled newspapers, masking tape, paper towels infused with Woodland Scenics plaster and rock moulds made from hydrocal and shrewdly placed on the layout surface.

Landscape scenery employed many Woodland Scenic products, especially ground foam and foliage. Additional ground cover were weeds located along the CPR mainline close to his home and various shades of green fibres planted appropriately in the landscape. Fall coloured trees are manufactured by Supertrees. Deciduous trees are enhanced Woodland Scenics products. Evergreen trees are hand made by Neil.

Neil continues to enhance his layout especially the industrial and yard area leading off from one loop curve. He is an avid railfan and is often found in reasonable weather as a participant in the Friday afternoon railfan enclave at the Cobourg VIA station parking lot. With other railfan buddies he also ventures to sites in southern Ontario and occasionally into similar sites in the northern American states for railfanning opportunities.

Photo Above: From a hill west of East Falls' a railfan captured the lucky moment when three trains were in the camera frame. The tail end of CPR's the Canadian occupies the east main while on the west main two CPR freight units are heading their train westward. Both CP trains are passing a CNR steam locomotive, 3533, stored serviceable, and waiting for the summer weekend excursion season to commence.

Rolling Stock Weathering with PanPastels

By George Dutka

EDITORS NOTE: I felt it was important to show the photographs for this article in colour. It is the only way to appreciate the weathering effects. The photographs can be found on the back cover. The captions for the photographs are included at the end of the text. Refer to the back cover to view the appropriate photograph.

PanPastels are one of the newer weathering products available to us model railroaders that can be applied very easily. It also is a product that if one does not get the weathering effect desired, it can be easily removed. One just simply wash's it off a plastic model. A note, it will not remove as easy from wood rolling stock kits. There likely will be a bit of a stain.

PanPastels are a finely ground highly pigmented dry colouring in a pan or as I call them pods. I believe the pastels are pressure applied to the pods. Here is a bit of advice, they don't do well when they are dropped. My experience with a drop found the pastel broken up into chunks inside the pod making it a bit harder to apply, but still useful.

What one's taste is towards weathering; this product can get you there. Everyone has a different view to how the real world looks. Some see weathering as a subtle effect while others see an extreme view. There are no right or wrong ways, just different approaches.

One may remember MR articles by Tony Koester's where he accomplishes projects in 60 seconds, one such is ***Weathering equipment in 60 Seconds***. Tony was using PanPastels on rolling stock, finishing one per minute. Tony has a very large fleet and his approach gets it done for him. Tony's approach might be a nice thought, my own findings are to get a nice job it takes a bit more effort. Here is what I learned.

To begin with one should invest in some really good brushes. The foam pads just don't cut it when controlled weathering is expected. I have tried the foam pads but have never been happy. I purchased a set of 6 artist brushes which are sold as a group for about $15. There is a variety of sizes in the package. I also use micro brushes which are fairly cheap and gives one excellent results on rivet seams and hard to reach locations. My weathering brushes are exclusively used for weathering and never used for application of paints.

In the ads PanPastels are advertised as easy weathering with effects in seconds. They have 28 base colours with 7 more specialty shades. A starter set and a locomotive and rolling stock set are available which include 7 commonly needed shades in each group. Although these set are nice I would suggest going with a few of the basic colours to begin. If one is just beginning with PanPastels consider purchasing just two or three pods. The shades I would suggest investing into first are the following 6 colours. If your budget is tight the first three will get you started.

Raw Umber Shade: a good base earthy dirty colour found in the earth and stone shades grouping.

Red Iron Oxide Extra Dark: a darker red which is a good weathering match to Floquil Tuscan red and many other shades of boxcar red. This colour falls into the rust and corrosion shades group.

Neutral Gray: a nice light gray which accents gray covered hoppers and works well on car roofs as faded areas. It is found in the dust and soot shades grouping.

Titanium White: a nice colour for highlighting details, steaking of road names, numbers and cement spillage on hoppers. Look under dust and soot for this shade.

Burnt Sienna: a rust shade which looks really good anywhere fresh rust would be found. I like applying this shade to my couplers and wheels, found in the rust and corrosion shades.

Neutral Grey Extra Dark: a nice dark shade of gray that is a better choice than black and can be found in the dust and soot colouring grouping.

Three other colour pods I have also purchased and am very happy with are as follows. I do have a group of specialty shades which are very interesting to use and this will probably take a second article to explain.

Chrome Oxide Green Shade: a colour I have found that is very similar to Floquil depot olive. I have used this full strength on wood trim and plastic parts as the main colouring with very good results. Some old passenger cars did have an olive colouring. This tone works well to accent that tone with a very flat chalky finish. It is found under the primary colour grouping.

Paynes Gray Extra Dark: a very dark shade of gray, almost black in colour. I use this as my go to black on projects and it is found in the dust and soot shades.

Burnt Sienna Shade: a lighter brown colouring I have used in limited amount on boxcar sides and roofing. It is a great colour to use when painting structures and is found in the rust and corrosion shades. This shade can be mixed with other browns to come up with another interesting colour.

Peter Mumby and I get together for workshops on Monday's. On some of these days we work on weathering our collection of rolling stock. Peter supplied a list of his favourite PanPastels choices for weathering.

Raw Umber Tint: used as a subtle shade of white.

Neutral Gray Extra Dark: a dark gray that Peter uses as his first choice for black.

Raw Umber: a good choice for grime and dirt weathering.

Burnt Sienna: a great looking rust colouring.

If you compare my list of go-to colours with Peter's you will note there are two we commonly used. When we weather together we try each other colours also. Peter also purchased a few optional colours that also work well.

Red Iron Oxide Extra Dark & Red Iron Oxide Shade: are two colours Peter uses to weather boxcar red models. He at times combine the two colours together.

Applying PanPastels

So now that we have the colours we need how do we come up with the right weathering affects. On my 1950's fleet of equipment there is a similar feel to each piece of rolling stock (lightly weathered). I do have a group of 1970's equipment that may have been well abused with weathering techniques. My engines and caboose are done more lightly than my rolling stock. My thought when it comes to applying weathering - less is more. The following quote by Lance Mindheim I feel really tell us what we are looking for in our weathering efforts. "Effective weathering is probably the most critical step in determining whether a model comes across as an effective representation. Always apply less weathering than you think you need."

When one views a layout the individual car details, paint and lettering are not that obvious in the overall view, but the weathered look one sees in the scenes being viewed are. This overall effect of ones layout is clearly highlighted by how one's weathering appears.

When I began applying PanPastels about 4 years ago I really had it going on heavy. I would use my fingers to blend it in better, removing some of the weathering as I went along. I also found when a piece of rolling stock was finished it looked great on the workbench but once on the layout next to the fleet it really seems overdone. To correct the weathering, I found my best option next to washing it off was to re-spray the model using my airbrush and the base colour of the model. This is done by applying a very light coat, more like a wash. This really toned down the weathering and helped attach the powders to the model. A lot of extra work!

Lance mentioned working on the "backdrop side first", the side facing away from the layout aisle and the viewers. This would be the test side and a good rule to follow. When weathering rolling stock, it is really hard to know when to quit, a real skill one needs to acquire. Some learn quickly others take decades such as me.

Before any weathering is applied to my models I apply a coat of flat finish or dulcote from a spray bomb or by air brushing. The weathering powders appear to attach much better after this process. It also dulls down the shine on areas that may not get weathered.

My weathering process begins with the roof, moving to the ends then the sides. I dab my brush into the PanPastel pod then wipe a good amount off the

brush on a paper towel before applying it to my rolling stock. Doing this allows me better control of the amount of weathering being applied. If I go over an area two or three times with my brush to get the right effect I think it is much better than trying to remove a heavy coating.

Once the PanPastels are applied should the rolling stock be sealed? My thought is leave it as is. If you wish to seal a model with a flat finish, use an airbrush as one can control the amount applied. PanPastel weathering is very forgiving when cars are handled and if a touch up is required one only needs to pull out a weathering brush and drag it over the surface moving some of the pigments around. PanPastel weathering is a learning process with no right or wrong approaches. I suggest one pick a few favourite tones and get at it - you will really love the effects.

PHOTOGRAPH CAPTIONS
PHOTOGRAPHS LOCATED ON THE BACK COVER

Photo 1
My brush collection used exclusively with my PanPastels and other weathering powders.

Photo 2
From left to right, Raw Umber Shade, Red Iron Oxide Extra Dark, Neutral Gray and Titanium White.

Photo 3
Before…My Tichy boxcar with weathering finished. I realized once the car was on the layout and especially when I photographed it the weathering on the roof was quite heavy.

Photo 4
After…My Tichy boxcar got a light coat of Floquil grimy black on the roof which really toned down the weathering. About that time, I changed my approach to weathering. I now rub my brush off on a paper towel to remove some of the powder before touching the model with the brush. This has been making a huge difference in appearance.

Photo 5
My Athearn B&M F7 recently got weathered. On the nose I used Raw Umber Shade to add some grime. The pilot got two tones, Raw Umber Shade followed by Neutral Gray. The fuel tank and trucks got the same treatment.

Photo 6
A look at the roof of the F7 reveals a really gritty look. I began with Floquil grimy black followed by a coat of flat finish from a spray bomb. Once dry I randomly brushed on some 70% alcohol and India ink mix. This mix effects the flat finish giving it a really neat appearance. I then followed this with PanPastel Raw Umber Shade, Neutral Gray and Bragdon powders soot (black).

Photo 7
My CN storage boxcar got a good dose of weathering as it's life in service is over. The roof got a coat of Red Iron Oxide Dark followed with Neutral Gray applied to the center of the panels. The walls got a dusting of Burnt Sienna Shade and Red Iron Oxide Dark. With this model being a beaten up old carbody, heavy weathering is OK.

Photo 8
My B&M storage car is another candidate for a good amount of grime. Once again, the roof's center panels got a good dose of Neutral Gray. Neutral Gray was also applied to the walls but much more lightly this time.

Photo 9
I began with an undecorated Proto gondola. Once painted, decaled and flat finish is applied I used a very light application of Burnt Sienna Shade on the sides and Titanium White streaking down from the lettering. I think the overall effect turned out well.

Photo 10
Another undecorated Proto gondola was painted black followed by decaling and flat finish. I used three tones of PanPastels on this model. Being dark the Burnt Sienna Shade needs to be applied very sparingly. I wiped most of the power off before rubbing the brush along the sides. The lettering once again got streaked with Titanium White. One needs to watch how much white is applied as it really stands out if too much is applied. At this point I dabbed a few locations with Burnt Sienna using a micro brush. I then dragged the powders down with a clean larger brush leaving a few very small rust streaks.

Photo 11
A string of boxcars along the White River Division views the different shades of boxcar red that have been used. Some is factory applied, others Floquil boxcar red I airbrushed on. By using various shades of browns and rust PanPastels one can accent the looks of these cars. All my rolling stock has got some degree of weathering and almost all of these cars have PanPastels applied to some degree.

Rolling Stock Weathering with PanPastels

Photos by George Dutka

PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

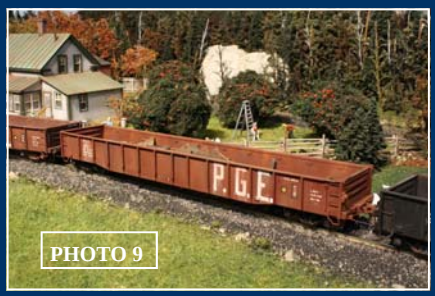


PHOTO 9

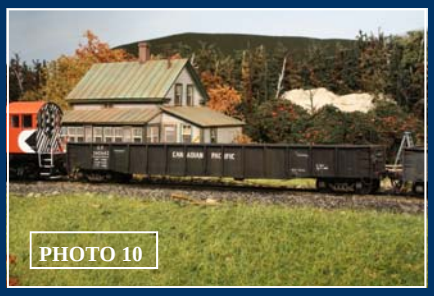


PHOTO 10

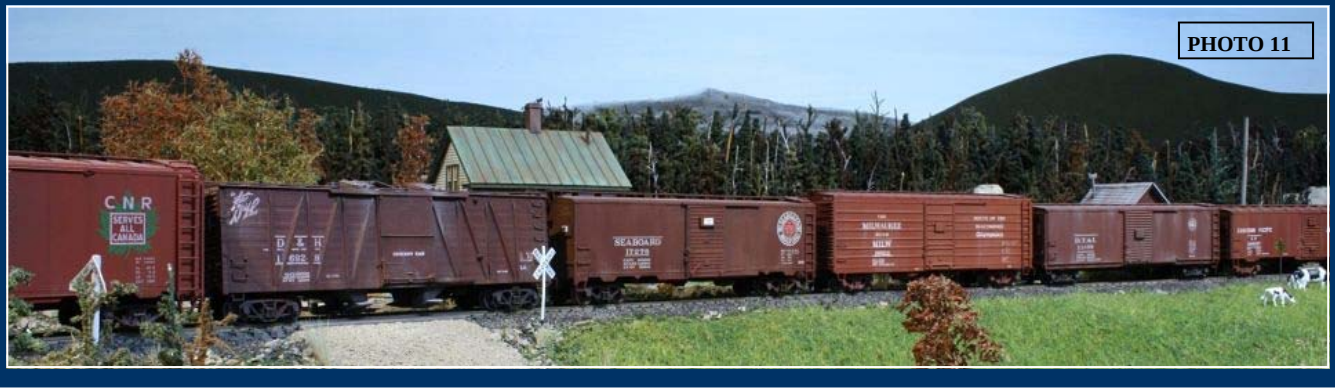


PHOTO 11