



**48 HOURS**  
*of*  
**WATKINS  
GLEN**

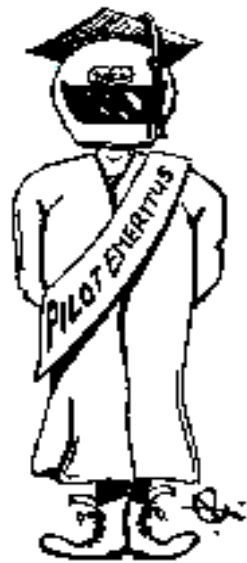
**DRIVER'S EDUCATION**

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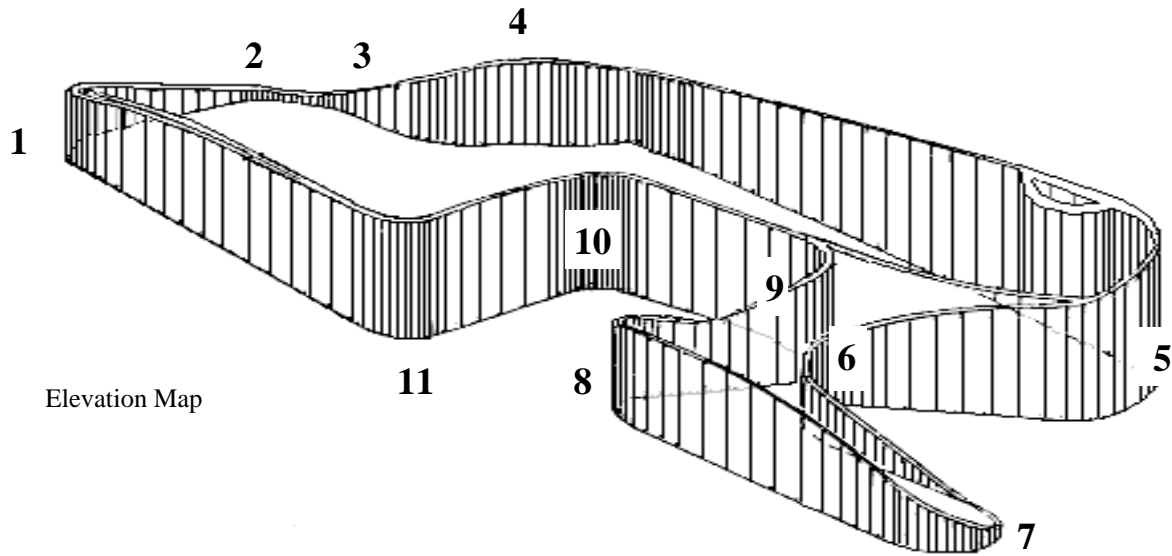
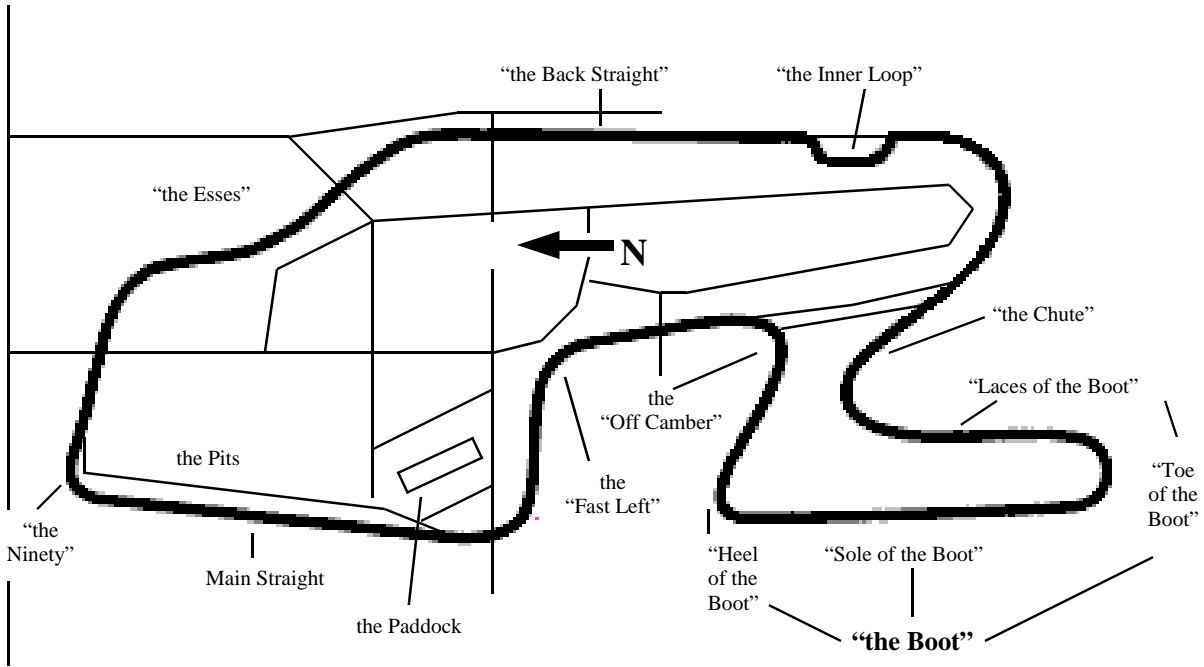
*of the*

**PORSCHE CLUB of AMERICA**



by John Hajny, Central NY Region / Zone 1 Instructor

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Elevation Map

**PLEASE NOTE**

The turn diagram section of this document is based on the original work of the late Walter Leising, and appears here in a highly revised, augmented, and updated state.

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# Driver's Education at Watkins Glen

by John Hajny, Central NY Region / Zone 1 Instructor

Welcome to Zone 1's Porsche Club of America Driver's Education event, the 48 Hours of Watkins Glen. This is the largest event of its kind in the entire PCA, and is a happening like no other. We hope you enjoy this opportunity to experience one of the most historic tracks in all motorsports. Most of racing's great heroes have driven here, and soon, you'll be sharing in that history too!

Watkins Glen is a 3.37 mile, 11 turn (long course) track following the natural terrain of this scenic area. The elevation changes are pronounced, so you can expect an exciting roller coaster ride. It is also wider than most tracks, and the facilities are first rate and lend themselves perfectly to our purposes. It is a big place and can be a daunting experience, especially to those who may have cut their teeth on smaller tracks. For this reason, it will also be one of the most memorable tracks you will ever drive.

This document is intended to provide a uniform baseline for students and instructors to maximize the benefits of PCA Driver's Education. The information contained herein will serve to accelerate your learning of this *very* technical track. It is not intended to represent the "fastest" approach, but a safe and practical beginning. Remember, safety is always of paramount concern!

Driver's Education in general is not nearly as stressful on your car as you might imagine. However, as mentioned earlier, this is a big place and the straights are long and fast. For this reason, you should pay particular attention to your brakes.

Make sure you have fresh pads and fluid and that your brake lines are sound. The high speeds here translate into high heat and wear. You can easily boil weak fluid and burn up cheap or thin pads on this track. Service these items *now* and bring spares if your car has high speed potential. Monitor the condition of your brakes continuously, both on and off the track. A quick tap of the peddle before a critical braking zone, while perhaps not seeming "cool," may save you from a nasty experience.

Take advantage of the extensive paved access roads to cool your brakes properly between runs. Simply parking after a run may allow brake vapors to condense on or pad material to transfer to the rotor surface and cause severe brake shudder or even rotor

warpage. This will be a very unpleasant result!

You should also pay particular attention to your personal needs. The concentration necessitated by this track can easily drain you of energy and fluids rapidly. Try to keep cool, eat well, and drink plenty of liquids - particularly in the hot summer months. Dehydration and fatigue are dangerous problems that can be easily avoided with proper care.

Throughout this document, you will notice the mention of various reference points that can assist you in driving the course properly. By working with your instructor, you will learn to identify such objects as cones, distance markers, seams and patches in the pavement, objects close to the track surface, etc., that will aid you in developing safe and consistent technique. One should keep ones attention generally focused **well ahead** of the vehicle at all times (with regular glances in the mirrors) and not fixate on these references; simply note them and relegate them to your peripheral vision. Good use of peripheral vision will be important in keeping you alert and aware of your entire surroundings.

Vision and safety certainly come into play where passing is concerned. This is one area that should be handled with utmost discretion. Passing is simplified on this track by the long wide straights. However, speed differentials can be great and it is **very important** to observe proper passing etiquette at all times. Passing zones and signalling will be discussed in the driver's meeting.

Unlike many events you may attend, the flaggers here are Race Communication Association pros. They are the best in the business and you should look to them for guidance if something is amiss. Make no mistake, if you are doing something wrong, **THEY WILL SEE IT!** They are also a lot of fun. Give them a wave on your cool-down lap and show your appreciation. They are the embodiment of the goals of this event:

## **Safety & Fun!**

Read on for more detailed information about driving at the Glen!

# Common Misconceptions

## R-COMPOUND TIRES WILL MAKE ME A BETTER DRIVER

WRONG !

The use of such tires is widespread among performance driving enthusiasts. If you have been contemplating such a purchase, consider this: This is Driver's Education, and you are here to learn the art of car control, not necessarily how to drive fast. It is much easier to access the limits of a set of street tires than the stickier variety, so one learns more progressively and at a more reasonable speed. Knowing what your car will do, what it feels like, and what action to take when it moves around is obviously very important. While the cornering and braking limits of the sticky tires are much higher, they will allow you to "get away" with improper technique and sloppy driving initially, but are MUCH less forgiving at their higher limits. You may find yourself in over your head; going far too fast to correct for a moment that you were not at all expecting. Really learning to drive well means being prepared with the proper REFLEXIVE RESPONSE. Street tires offer the best way of learning these responses and ingraining them in your reflexive memory through consistency and repetition. Start at the beginning!

Here are some other common misconceptions that many people operate under when considering Driver's Education. In reality, these can be dismissed as: practically non-existent; simple anxiety caused by the unknown; down right silliness.

**I WILL BE TOO SLOW** - This is education, not racing. It is not unlike school. Different people have different potentials and agendas, and there are no prizes awarded for rapid retention. You will be placed in a group that suits your car and ability, with an instructor that suits your person, so you can learn at your own pace and drive at your own speed. Your personal comfort level is important, so don't *ever* feel you must exceed it

**I WILL MAKE A FOOL OF MYSELF** - Just like everything else in life: try something new, stumble, make mistakes, scratch your head, persevere. The one thing that everyone regardless of their current level can say about Driver's Ed. Is: BEEN THERE, DONE THAT, GOT THE T-SHIRT !

**I WILL HARM MY CAR MECHANICALLY** - Obviously, increased stress means increased wear. If your car is in shabby condition, you likely won't pass pre-tech anyway. Unless you are really driving fast and hard (which is unlikely if you are a novice), the added stress on Porsche's traditionally over-engineered components will be negligible. In certain respects, Driver's Ed. Can be a good thing, as it demands that you maintain your car to a higher level and it will be treated to things that it normally may not receive, like fresh brake fluid every year, brake pads and water hoses, wheel bearings re-packed or replaced, etc. You'll find you will get to know more about your car, and the fun is definitely worth the maintenance!

**I WILL HARM MY CAR COSMETICALLY** - This is the only category of tangible concern. However, with some preparation - such as a fresh coat of wax, nose mask, racer's tape, mud flaps, etc. - cosmetic injury can be virtually eliminated. There are many cars that are track driven that also provide stiff competition on the concours field. And anyway, Porsches were built to fly free. What would you rather have; a garage queen that deteriorates just sitting there, or a seductress that excites you?

And the biggie...

## **WHAT IF I WRECK MY CAR?**

NOT GONNA HAPPEN! Anyone who is even moderately prudent, who loves their car and takes care of it faithfully, will not do anything to jeopardize their investment. If you take up racing, you must rationalize the loss of a car as a possibility. Once again, however, this is not TV, we are not racing, and the likelihood of an off-track excursion is statistically insignificant, let alone any contact with a solid object. You honestly stand a *far greater* chance of wrecking your car driving on public roads than at Driver's Ed.

# Points to Ponder

## Basics for Driver's Education Success

### Final Tech Inspection

You will be required to go through final tech inspection at the track each morning. This is a last minute check to insure that all items on the pre-tech list have been attended to properly and that no problems have surfaced subsequently. Bring your tech form, have your car emptied of all loose items (including floor mats), have your car numbers displayed, and have your helmet ready for inspection.

**Please arrive early and prepared for final tech !**

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### Proper Frame of Mind and Objectives

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Learning to drive your car at Watkins Glen is one of the greatest experiences imaginable. Be ready to thoroughly enjoy yourself, and to share it with your fellow PCAers! The knowledge and skill you gain at Driver's Education will transfer directly to everyday life, making you a better driver on the street and giving you increased confidence and ability behind the wheel. If you discover strong interest, the techniques you will be learning will serve as a solid foundation for further performance driving study.

If you are a novice, you will be assigned an instructor. **MAKE USE OF THEM.** If you are unsure of something, **ASK!** They will be more than willing to help. When you get together with your instructor, think of yourself as an open book with no text on the pages, or a sponge - ready to soak up everything you can. Assume that you know nothing, regardless of how much you may have read on the subject or how proficient you may feel as a street driver. You are here to learn how to drive swiftly and safely and to have a **GREAT TIME**, not to race or win trophies. You will impress your instructor by listening and being a good study, not by being "fast."

If for any reason you feel uncomfortable with your assigned instructor, feel that effective communication

is lacking, or have any other problems, see one of the event stewards. They will do everything possible to see that you get an instructor that better suits your needs.

Heed the advice and instructions of event personnel. They are volunteering their time and working hard to keep this a safe and fun event for everyone!

You will be attempting to process lots of information; the basic line of the track, turn in, apex, and track out cones, braking, shifting, and cornering techniques, the names and numbers of the turns and straights, and track safety. Don't worry if it is overwhelming at first. Your instructor will guide you and make sure you are functioning properly. **LISTEN!**

When you have completed a run, talk it over with your instructor. Look for areas that need improvement and seek their input. When you are preparing for your next run, make a list of objectives so that you will have a sound agenda for the session. Don't worry if you are having trouble putting everything together to form a well driven lap. The Glen is a big place, with turns of widely varying style, and it takes a lot of time and effort to put it all together and "feel a rhythm." Patience and concentration will be rewarded!

If you are a novice, your instructor will drive your car for a few laps (at least two) at a reduced and comfortable pace to help familiarize you with the track layout, car positioning and visual references, flag stations, etc. Don't worry about remembering every detail for now, just get a general idea of where you are supposed to be and what is expected of you on the track. If you would like them to continue for a few laps longer to reinforce what they have been showing you, simply ask them and they will oblige. This is highly recommended.

# The Most Basic Components of Performance Driving

1) **Maximize Straightaway Length.** There exists a turn-in point and cornering arc that will effectively lengthen the straightaway following a given turn. If you experiment by using the entire track width, you will discover an optimum cornering method that will allow you to straighten your front wheels and accelerate earlier than if you were to simply follow the actual arc of the turn.

2) **Minimize Cornering Arc.** Find a turn-in, apex, and track-out point that will minimize the arc by which you traverse the corner. The goal is to have your front wheels turned as little as possible, but more importantly, for the shortest time and distance. The level to which you can accelerate exiting a turn is in proportion to your cornering speed and the amount your wheels are turned. It stands to reason that you cannot accelerate hard if your front wheels are turned substantially. The sooner you can straighten them out, the sooner and harder you can get on the gas. By minimizing your cornering arc, you have the second component needed to maximize your accelerative potential and hence, your **terminal straightaway velocity**.

3) **Maintain Even Cornering Balance.** In an often used word, **SMOOTHNESS!** To maximize acceleration and cornering speed, you must have even balance in the car's cornering attitude. This means that the inputs you make to the car (throttle, steering, braking) must not cause any undue weight shift to any one corner of the car's suspension. If you slam on the brakes, the resultant forward weight shift will lighten the rear end, possibly causing an oversteer situation (the rear becomes "loose", or wants to pass the front!). If you jump on the gas in a corner, weight will shift to the rear and front tire adhesion will be lessened, causing plow or push (car won't steer as tightly as intended). By applying the necessary inputs properly, you can maintain the **OPTIMUM RELATIVE EQUALITY** between the four corners of the suspension and allow each tire to maintain maximum adhesion. If this relationship becomes too unbalanced in a corner, you will have to give up acceleration time in order to maintain control. This is not the fast way around the track.

**Fix this in your memory: SMOOTH IS THE FIRST STEP TO *SWIFT!***

**AT FIRST, PERFORMANCE DRIVING TAKES MUCH STUDY AND THOUGHT. THERE IS A LOT TO DO AND LEARN. HOWEVER, IF YOU PRACTICE AND BECOME PROFICIENT AT THE ABOVE SKILLS, NOT ONLY WILL YOU BE DRIVING SWIFTLY AND SAFELY... YOU'LL ALSO BE HAVING LOTS OF FUN!**

## Terminology

In order to simplify the task of learning "The LINE", a distilled list of terms should be employed. Work with your instructor to make sure you understand the terms being used. A good example of basic terminology would be:

**LIFT** - Backing off the throttle (in a straight line) is the first step in corner preparation.

**BRAKE** - Apply the brakes smoothly but firmly to decelerate.

**SHIFT** - Downshift into the proper gear to accelerate through and out of the corner.

**TURN** - Initiate the turn. Your eyes should be looking for the apex cone. Let your hands follow your eyes.

**THROTTLE** - Apply throttle smoothly to maintain cornering balance and to accelerate out of the turn.

**APEX** - The inside center point of your chosen cornering arc.

**TRACK OUT** - Gradually unwind the steering wheel after the apex and drift toward a track out point as you accelerate, using the full track width.

Thus, the distilled verbal cornering sequence may sound like this:

1. **LIFT** (off the gas).
2. **BRAKE** (in a straight line, downshift if necessary).
3. **OFF BRAKE** (release brakes before turning).
4. **TURN** (into corner smoothly but decisively).
5. **THROTTLE** - (gradually feed in throttle).
6. **APEX** - (aim to "Clip" the center of your arc).
7. **TRACK OUT** - (guide car toward track out point).

**LIFT, BRAKE, OFF BRAKE, TURN,  
THROTTLE, APEX, TRACK OUT.  
SIMPLE & CONCISE!**

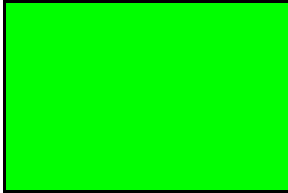
Use of a like sequence of terms should greatly assist your learning experience.

# On-Track Communications

## A Description of All Flags Used On-Track

There are various types of flags used to signal different information to drivers on the track. You should familiarize yourself with them so that if one of them is displayed, you will know what is required of you.

(They are noted as to their frequency of display: **Primary & Secondary**).



THE GREEN FLAG: The track is open and clear. Generally only displayed at the start/finish line.

**(PRIMARY FLAG)**

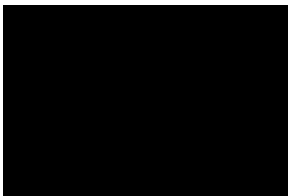


THE YELLOW FLAG/LIGHTS: CAUTION. There is or was trouble ahead. Check your mirrors quickly and slow down but do not stop, prepare to take evasive action, and **DO NOT PASS**. This flag is displayed at the effected stations. **IF THE FLAG IS STATIONARY:** Beware. There has been an incident ahead, but it is probably not severe. Use caution. **NOTE:** Yellow is also generally displayed on the first lap of a session to indicate a warm up lap. **IF THE FLAG IS WAVING:** There is likely something blocking the track. Use **EXTREME** caution. **(PRIMARY FLAG)**



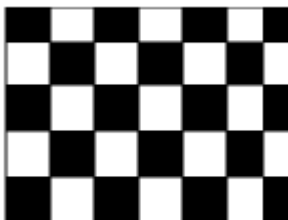
THE RED FLAG: There is a **serious** problem up ahead. Check your mirrors quickly, slow and stop sensibly, and pull well off the driving line or track surface. Look to the corner workers for further instructions. A red flag **DOES NOT** mean that a panic stop is appropriate. Displayed at ALL stations.

**(PRIMARY FLAG)**



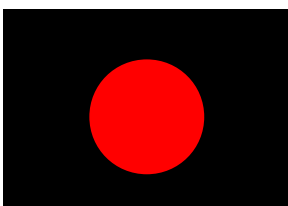
THE BLACK FLAG: There is a problem with you or your car. Report **immediately** to the pit lane staff.

**(PRIMARY FLAG)**



THE CHECKERED FLAG: Signifies that the run is over. Drive at a reduced pace to cool your car and self and come into the pits. **NO PASSING**. Generally displayed at the entrance to the Inner Loop. Never pass the same checkered flag twice.

**(PRIMARY FLAG)**



THE MEATBALL: There is a problem with your car. Report **immediately** to the pit lane staff.

**(SECONDARY FLAG)**



THE PASSING FLAG: (Blue flag/Yellow stripe) A reminder that a faster car/driver is behind you. Be courteous; lift and let them pass at the **next available opportunity**.  
(SECONDARY FLAG)



THE OIL FLAG: (Yellow flag/ Red stripes) There is a slippery area on the track caused by rain, oil, dirt, coolant, etc. Proceed with caution until you have properly assessed the situation!  
(SECONDARY FLAG)



THE WHITE FLAG: There is an emergency vehicle on-track. Watch for and yield to this vehicle. Pass **ONLY IF YOU ARE CERTAIN YOU CAN DO SO SAFELY**. (Note: A Red flag would most likely be displayed)  
(SECONDARY FLAG)

# The Rules for Passing

Passing is an area where indecision can be annoying to other drivers and potentially dangerous. All passes should be made with faultless precision and *substantial* margin for error using proper procedure. Check your mirrors often and if faster traffic is approaching, **SIGNAL, LIFT** and **LET THEM PASS!** All passes should be initiated by giving a direct and *emphatic* point of the index finger up and over the roof of your car to the right side of your vehicle. **Any other motion is NOT ACCEPTABLE!**

As the passée, you are in control. Allow for smooth, rapid traffic flow if possible, but give the proper signal **ONLY WHEN YOU FEEL COMFORTABLE**. Your instructor will help you with traffic initially. **REMEMBER:**

- \* Pass only in designated zones.
- \* Pass only when given a proper signal.  
NO SIGNAL - NO PASS !!
- \* The overtaking car goes “off-line” to make the pass.
- \* If you are being passed, **ease up on your throttle to facilitate the maneuver.**
- \* **NO LATE PASSING!** If the pass cannot be completed within the designated zone...  
DO NOT ATTEMPT IT!

**DRIVERS THAT:**

FOLLOW TOO CLOSE - FAIL TO GIVE A SIGNAL - PASS WITHOUT A SIGNAL...  
**WILL BE BLACK FLAGGED**

REPEAT OFFENDERS WILL BE INVITED TO LEAVE !

Here’s another thought on passing. When someone has just done you the courtesy of allowing you a safe and timely pass, give them a friendly wave. True; they are supposed to let you pass anyway. But we are all friends here, and a friendly wave is a reminder of that. Courtesy and friendship on the track will take you a long way toward achieving the root goal of Driver’s Education:  
**TO HAVE A GREAT TIME !**

# A Guide to Being Prepared When it's Time to Go

All the theory in the world will only take you so far. Sooner or later it will be time to strap 'em on and head for the track. Here are some practical points to think about when it's crunch time!

\* **SEEK YOUR MENTOR**: Find your Instructor as soon as possible, get in the car and stage early so you can discuss your agenda. Make every minute count! Never mind hiding in the back of the line. Remember, you're not the only rookie and it looks kind of silly & snarls the pits when EVERYONE is trying to be at the end of the line!

\* **GET COMFORTABLE IN THE CAR**: Make sure you can EASILY reach all controls. Remember, cornering forces may render your normal seat settings less than optimal. Legs and arms should be bent comfortably but not cramped. With your hands at 3 and 9 o'clock on the wheel, you should be able to cross your arms completely without pulling your shoulders away from the seat back. Perform a mental check list: Helmet and belts tight, mirrors adjusted, passenger ready, traffic clear, CONCENTRATE, deep breath, RELAX, ready to go!

\* **NO WHITE KNUCKLES**: You should refrain from employing a death grip on the steering wheel. Even Porsches without power assisted steering are easily manageable at speed. You should be able to steer most of the course with just the palms of your hands. Relaxing your grip on the wheel will be the first step in relaxing the rest of yourself so that you can grip the proper item: The task at hand!

\* **WHEN YOU EXIT THE PIT LANE**: Stay to the right as you merge onto the track and continue through the apex of turn two, checking your mirrors continuously for possible traffic coming upon you.

\* **FLAGGERS**: As early as possible, familiarize yourself with where the flag stations are. These people are your life line if something goes wrong up ahead.

**KNOW WHERE THEY ARE AND RESPECT THEM, THEY WILL SAVE YOUR BACON!**

\* **LEAVE YOURSELF ROOM**: Don't assume the other driver will make the correct move. Give them plenty of room, but never disappear into their blind spots or weave back and forth behind them! Don't run right on the edge of the track surface either, especially entering a corner. Allow at least an 18" margin of safety during braking in case there is a slippery spot or your car pulls sideways under heavy braking.

\* **DRIVE YOUR OWN LINE**: It is common for even relatively experienced drivers to be distracted and subsequently lead astray by focusing too intently on the car ahead. If that driver goes off the track, you certainly wouldn't want to be looking to them for proper guidance!

\* **VISION**: This will be difficult at first, but try training yourself from the start to look far ahead of your car. On the straights, scan your surroundings and mirrors constantly. Entering the turns, first spot the apex, then force yourself to look far ahead at the track out area and beyond, even if it means looking out the side window. If you are in a line of cars, don't fixate on the car ahead, but look further up the line. If there is going to be a problem, it will likely start 2 or 3 cars ahead and you will need to be ready to avoid traffic stacking up. By constantly scanning and training yourself to look ahead, you will improve your peripheral vision, your alertness, and you will find that your hands, and consequently your car, will follow your eyes! LOOK TO WHERE YOU WANT TO END UP!

\* **BRAKE AND SHIFT IN A STRAIGHT LINE**: Do your braking and shifting WELL BEFORE you turn into a corner. If you wait too long, you'll be scrambling and you and the car will not be balanced.

\* **DO NOT EARLY APEX!** At all costs, resist the natural temptation to turn in too early. Even if you have good balance, you will soon realize that you must steer back away from the apex to avoid literally hitting it. This may cause you to run out of room at the track-out point and possibly run off the track.

(You never want to literally "HIT/CLIP" an apex, merely come close! (1'-2')).

\* **DO NOT LIFT IN A TURN**: This is sometimes a hard reflex to unlearn, but try your hardest to do without this one. There are very few, if any, times when lifting in the middle of a turn should be done. This is a great way to provoke a spin out, particularly in a rear-engined car. If you experience some cornering discomfort, maintaining a steady throttle input will help steady the car and maintain that all important balance. Although it seems counter-intuitive, MORE throttle will get you out of trouble in most cases, particularly in a rear-engined car.

\* **DO NOT FORCE THE CAR**. If cornering distress occurs, don't force the car to stay on the track surface. You may precipitate a spin, thereby giving up control to the laws of physics. Don't try to do anything fancy in the

grass/dirt/gravel traps. Keep the car as straight as possible and try to tiptoe back to safety. If you realize early on that you don't have a chance of making the turn, try to slow as much as possible **IN A STRAIGHT LINE BEFORE** going off the track. When you leave the track surface, do your best to be gentle and maintain control. Do not try to turn sharply if you enter a gravel trap as this may cause a "dig & roll". In the unlikely event that you cannot avoid hitting the wall, it is far better to hit it straight on. You will make maximum use of your safety belts and the car's built-in crash protection. Also, remember this rule: If you spin, both feet in! In other words, if you spin, no matter where you are, depress the clutch and get on the brakes HARD until you come to a complete stop. A quick prayer wouldn't hurt either!

\* **RACING TECHNIQUES:** If you've done any reading on racing technique, you're probably curious. Save those racing tricks for when you become a racer! They require lots of practice, are only selectively applicable, and may get you in trouble. There *is* one technique that you should learn if possible: **Heel and Toe Downshifting.** A misnomer, it is more like Ball of foot/Side of foot. When slowing for a corner, only the ball of your right foot is used to apply the brakes. When you wish to downshift, roll the right side of your foot (which is still braking) onto the gas pedal, give it a "blip" after depressing the clutch, and make your shift. It is a method of braking and shifting all at once that significantly smoothes corner set up and reduces braking distances. Otherwise, you will have to brake (nose dives), let off the brake (nose rises), "blip" and shift, get back on the brake (nose dives again), let off the brake (nose rises again)... Or, you will brake with your right foot as normal and complete your shift by just slipping out the clutch. Obviously, neither of these is the ultimate ticket! NOTE: You may want to adjust your brake pedal height to more closely match the throttle height, particularly in a 911.

\* **SLOW IN, FAST OUT:** If you charge into a turn, you will waste valuable time trying to regain the car's cornering composure. You have now "blown" the corner, giving up all the speed you had upon entering. You cannot get that momentum back, even with huge horsepower! If you go in more slowly, you will maintain better balance and be able to accelerate sooner. It is not necessarily how fast you go in, but how much momentum you can safely carry and how fast you come out that determines terminal velocity on the ensuing straightaway. If you've developed extra momentum coming out of a turn, it will carry with you all the way to the next corner.

\* **THAT PESKY CAR IN YOUR MIRRORS:** Perhaps you see a car coming on from behind entering a corner. You pull far away on the long straight, only to see the same car looming in your mirrors again a few turns later. Even though the car behind you is not faster than yours, **THE DRIVER IS!** In this case, you are actually holding the other car up. **LIFT AND LET THEM PASS!** More than likely, they will pull away and disappear from view. **Don't infringe on this driver's fun... Be courteous; lift and let them pass!**

\* **THE RED MIST:** Learn to realize early on when you are becoming frustrated by traffic, another driver's performance, or are simply getting tired. When you start to see the RED MIST in your eyes, it is probably a good time to remind yourself again why you are here and to give the benefit of the doubt. If you are stuck in a long train of cars, simply enter the pit lane slowly and cruise through at a reduced pace or even stop for a moment. The train will have moved on by this time and you should have open track to work with.

\* **THE CAR WILL TALK TO YOU... LISTEN!** Develop the ability to sense what the car needs by what it is doing. If the front tires are screaming in a turn, they are *pushing*, and you're either going too fast or turning too hard. If the rear-end comes around, you've either over-braked, braked too late or while turning, turned in too abruptly, chopped the throttle shut, or not released the brakes soon enough to allow the front end to un-weight and rise again and return suspension balance. Ride with other people and pay attention to the car's attitude. Ask your Instructor to reinforce the principals they have been espousing by *showing* you how it's done. Pretty soon, you'll be letting the car drive you as much as you are driving it. Remember, you can only do what the car will allow.

#### **LISTEN and FEEL!**

\* **IF YOU FEEL YOU'RE READY TO GO FASTER, BEWARE!** If you were to seek to increase your speed by 10%, you better be prepared and able to increase your CONCENTRATION by at least 20%! Things really start happening in a hurry the faster you go... at an exponential rate! Increased speed will likely alter all of your previous reference points, and to avoid getting in over your head you must be ready for the changing dynamic of the situation. Again, start from the beginning and work up to it. Never drive over your head!

# Parting Thoughts

## A Driver's Ed. Mission Statement

There are certainly many fine books written on the subject of high performance driving or racing technique that go into far greater detail than you will find here. It is not the intention of this document or this event to turn you into a "racer." This document is intended to set a proper mental table for **Driver's Education** success by touching on very basic concerns and highlighting underlying but essential truths; points which are sometimes obscured by the excitement of the moment. The purpose of **Driver's Ed.** is to teach you the rudiments of performance driving in the safe, controlled, and non-competitive environment of a racing circuit so that you may use this knowledge to further enhance your driving pleasure and safety, both on the track, and in everyday street driving.

The ideas offered here are meant to be a conservative and consistent starting point to your "performance driving career." Make no mistake, this is serious business, and there is no room for anything less than a serious attitude on the track. At the same time, this is also serious fun, and should certainly lead to a lifetime of heightened driving enjoyment.

To paraphrase the old Real Estate axiom, after Respect and Safety come the three most important components in **Drivers Education: The Line, The Line and The Line!** Many students start their training with the goal of attaining speed. This is *backwards*. Your initial thoughts should be of attaining proper *technique!* Unless you have mastered the tasks of corner dissection and proper car placement and control, speed will only serve to *hinder* your learning of these essential lessons. Many is the time that an Instructor has had to fight tooth and nail to get a student to slow down and learn the basic dynamics of performance driving *first* instead of trying to start at

the end with no solid foundation, wasting a lot of valuable track time in the process. Do yourself and your Instructor a favor; **learn the fundamentals first. Start at the Beginning!**

As mentioned earlier, the techniques espoused here represent a safe, sound starting point toward your learning of the rudiments of performance driving. After you have demonstrated first to your instructor, and then yourself, that you can perform the necessary tasks in a consistent and repeatable fashion, you may begin to experiment with different lines and techniques that may better compliment your personal and vehicular requirements. In short, you will have the fundamental understanding necessary to begin to develop your own driving style, and you will be better prepared to meet any situation that arises. **Being Prepared** is what driving is all about; be it on the track in Driver's Education, on the street, or in competition.

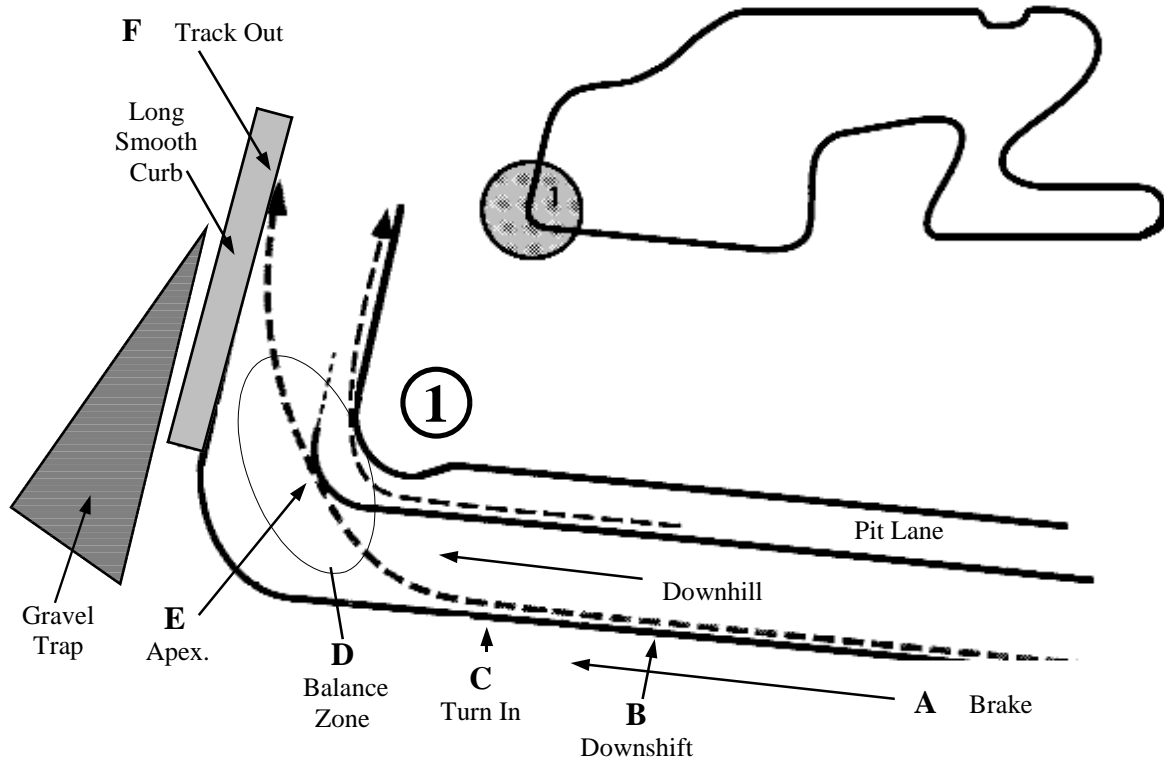
If you have never driven your car on a track before, you will shortly be discovering just what an incredible car a Porsche really is; something you could never do in everyday driving. **Porsche Club of America Driver's Education** is the best way to discover this.

Surely, you will be discovering something else; a whole new group of incredibly friendly and enthusiastic Porschephiles who share your interest in the marque. You may soon find that the people are what it's *really* all about. Serious Fun with Good Friends and Great Cars!

**That is the essence of the  
PCA Driver's Education experience !**



# Turn 1 "The Ninety"



## Procedure: Turn 1 - "The Ninety"

A) The approach to turn 1 is from the left side of the track. During the approach to this - **AND ALL CORNERS** - stay 12 to 18 inches from the edge of the pavement. This gives a margin for error in case of brake lock/pull or possible slippery conditions.

B) The approach speed is much higher than the cornering speed. Firm, hard and smooth braking is required and a downshift to third is often necessary. Shift after/late in braking to avoid over-revving the engine.

C) This is a **LATE APEX CORNER**, with a *late and very decisive turn in*. You may hear your tires "screaming" in the early portions of this turn; be patient - the track will "come back to you" after the apex and help you balance the tire grip again.

D) Begin progressive acceleration to balance the car when you're properly set for the apex.

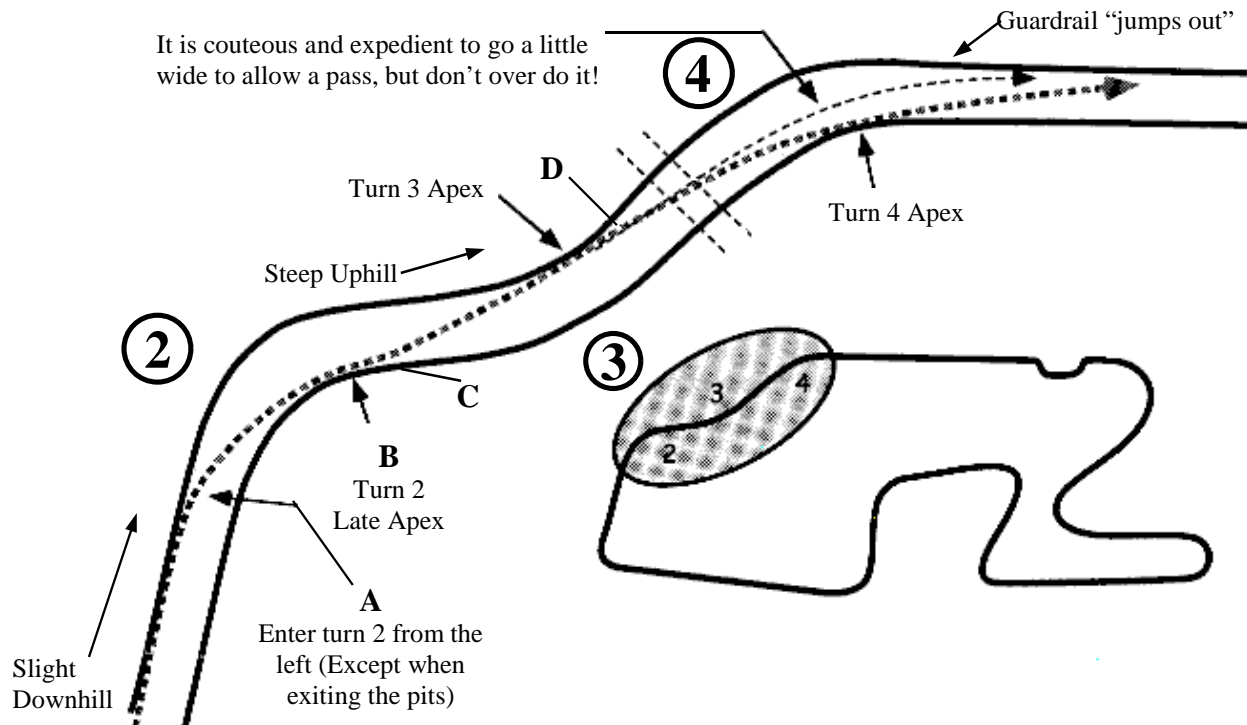
E) Increase smoothly to full acceleration as you pass the apex.

F) Momentum and cornering force should carry you to the track-out point. Track out fully and don't be afraid of running gently on the nice smooth curb. Accelerate and shift to 4th gear *before* turn 2.

**Notes:** The most common problems here are braking too late, carrying too much speed, and turning too early or drifting from the turn-in point. **DO NOT EARLY APEX**... it can be **DISASTROUS** !

**Objective: Fast exit.** This is probably the most important corner on the track for a "fast lap", as it takes you onto the long back straight. If you lose speed here, IT'S GONE FOR NEARLY A MILE!

# Turns 2, 3, & 4 “The Esses”



## Procedure: Turns 2, 3, & 4. The "Esses"

**Be aware!** Check your mirrors before entering turn 2. Is anyone gaining on you? Don't worry about them yet, but be prepared to let them by when you enter the back straight.

A) Turn 2 is quite fast and usually entered without braking. A slight *feathering* of the throttle may calm the car or your nerves, but the final goal is to go through flat out.

B) The apex for turn 2 is late, up and around the corner. **Hold the curb closely** (with safety margin).

**DO NOT DRIFT LEFT !**

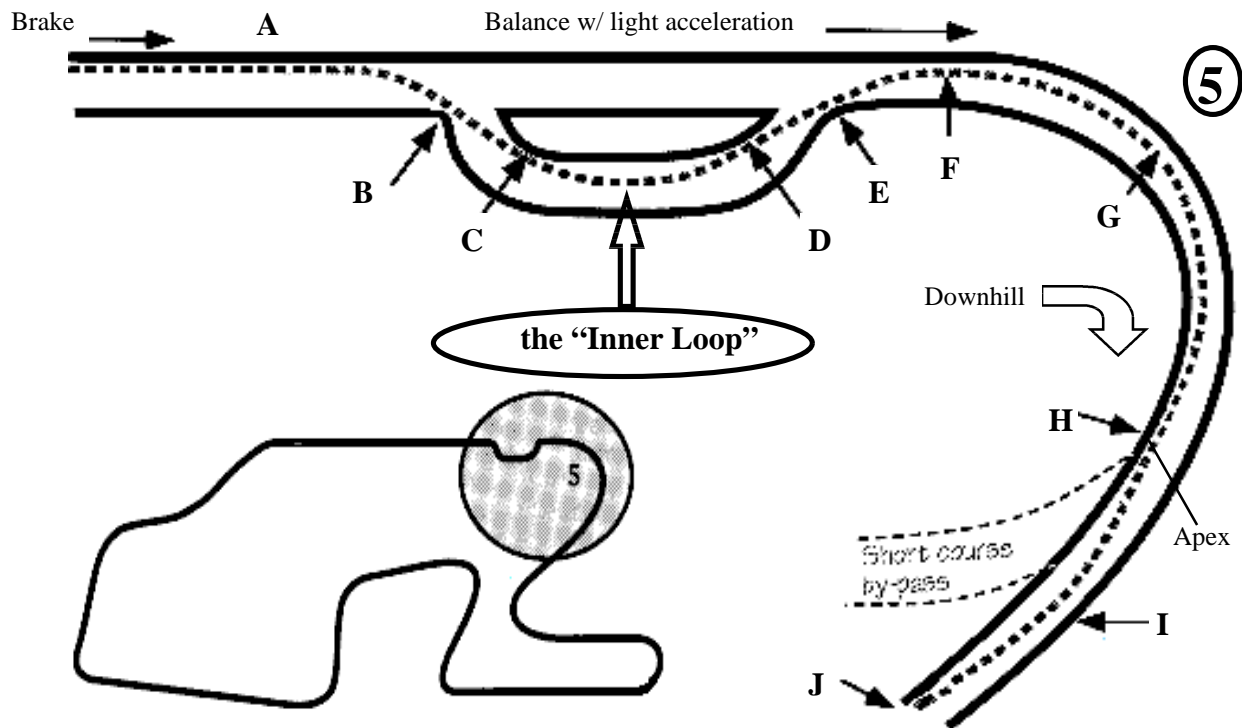
C) At the end of the curbing/guardrail on your right, begin your transition smoothly across the track - again holding the curb closely (this time to the left) - and toward the apex of turn 3.

D) After "clipping" the turn 3 apex, give another look in the mirrors as you begin your transition back to the right. If no one is behind you, continue smoothly toward the turn 4 apex. If you have faster company, stay *SLIGHTLY* to the left, allowing them room for the impending pass on the inside. Do this only if you are comfortable. Remember, the slower car has control of the pass.

**Notes:** You should hold the curbs closely through the Esses, but **NEVER HIT THEM**. Also, the left guardrail "jumps out" about 10' as you drift left into the straight. Don't go too far off line left to allow a pass - 1 lane width will suffice. Anticipate passes by checking your mirrors often. Aid the pass by lifting slightly if necessary. Remember, this person caught you, they are obviously faster. Be courteous... let them go!

**Objective: Smoothness and conservation of momentum!!** Never jerk the wheel. If your line is correct you can really fly and maximum momentum will be preserved!

# The "Inner Loop" & Turn 5



## Procedures: The "Inner Loop" & Turn 5 (The Inner Loop turns are not numbered)

**A)** The approach is from the left (with safety margin). Approach speeds are high, so firm to heavy braking is necessary. If you downshift, do so after braking to avoid an over-rev. Use the red and white paint markings on the left edge of the track as a basic turn-in point. They work well.

**B) TRY NOT TO HIT THE CURB HERE!** It will throw you off line, or worse!

**C)** After completing your entry, try for a smooth transition to the left. Don't clip the apex at C too closely. A little wider line here (2'-3') will allow a shallower and smoother exit arc, i.e. a straighter departure. Create a smooth arc connecting points C, D, and E.

**F)** Track out leaving about a car's width on the left at first. **VERY GRADUALLY** begin turning right as you **look far ahead** toward the apex. This is a **very late, blind apex - DON'T TURN TOO SOON!**

**G) BE PATIENT and DON'T TURN IN TOO MUCH... YOU'RE NOT NEARLY TO THE APEX YET!**

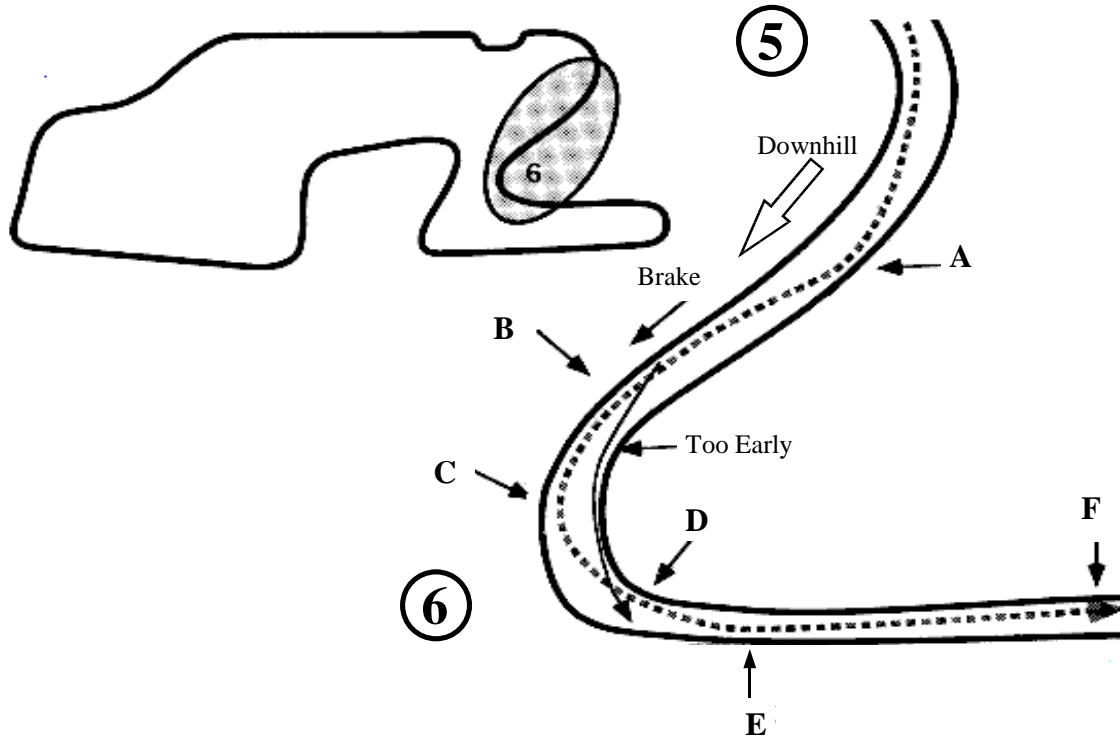
**H)** Once you've spotted the apex, accelerate smoothly, then at the apex, unwind the wheel, letting the car run to the track-out point (I). You will feel "big G's" here... be smooth and hold your line!

**J)** Gradually drift back to the right in preparation for turn 6

**Objective:** When you've become proficient, the proper arc will bring the Loop and turn 5 together, and allow you to gradually accelerate all the way from the entrance of the Loop through turn 5 and into "the Boot."

**WORK UP TO THIS SLOWLY!**

# Turn 6 “The Chute”



## Procedure: Turn 6, "The Chute"

A) This is the track-out point of turn 5. Continue accelerating down the hill and cross smoothly to the right. If you're really cooking, don't let the 4-high Armco's disrupt your concentration!

B) The approach is from the right. During the approach, brake hard and follow the outside edge of the pavement.

C) **STAY OUT TO THE RIGHT!** This is a very late, blind apex corner! This section has been paved and no reference points are visible yet. Listen to your instructor. The turn-in is later than you think. Do so smoothly but firmly.

D) As soon as you can see the apex, get on the gas and you will rocket down and out of the turn.  
**MAKE SURE TO CLIP A TIGHT APEX!**

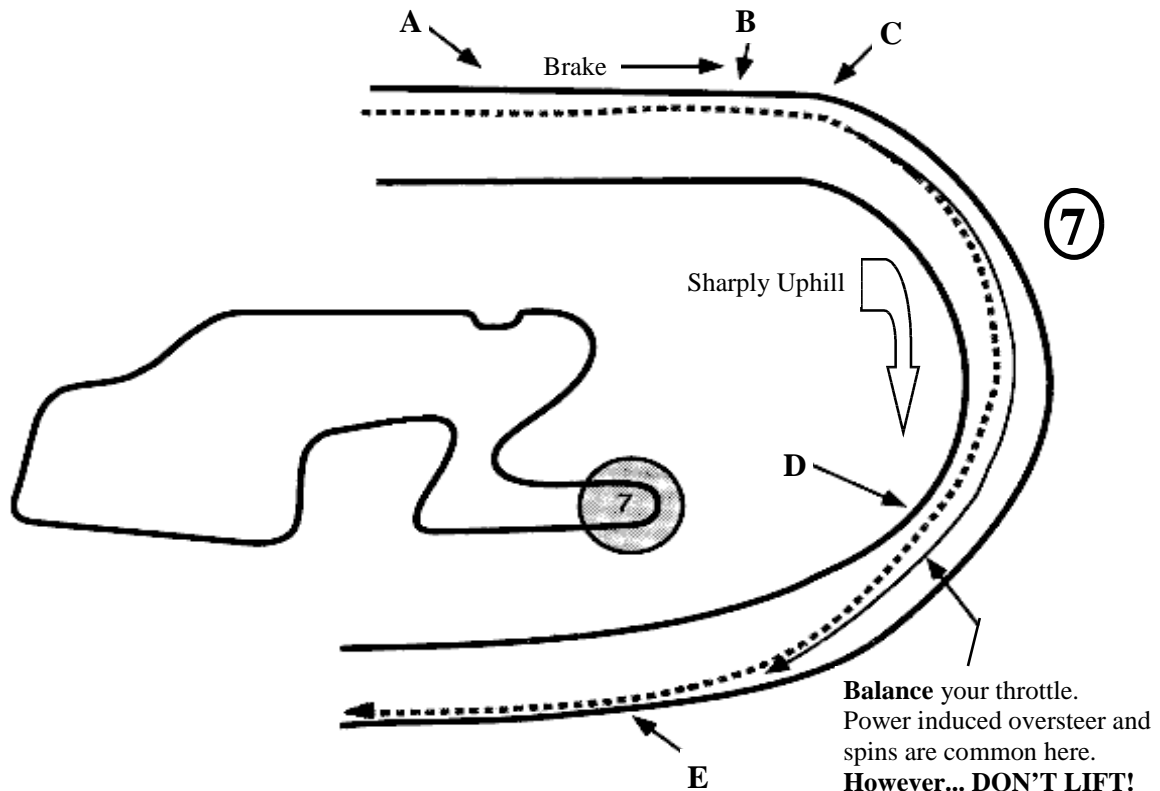
E) Track-out point for turn 6. The track gets somewhat narrow here... This may be a passing zone in your group.  
**CHECK YOUR MIRRORS GOING IN!**

F) Gradually cross to the left side and prepare for "The Toe of the Boot."

**Objective:** This is the trickiest turn on the track, and it looks nasty, but if you use this late apex method you will be safe and really blast down the short straight ahead! Remember,

**DON'T TURN IN TOO SOON OR YOU WILL RUN OUT OF TRACKOUT ROOM REAL QUICK !**

# Turn 7 “The Toe of the Boot”



## Procedure: Turn 7, The "Toe of the Boot"

A) Approach from the left, ready to brake and downshift.

B) Brake firmly and downshift to 3rd. **STAY TO THE LEFT, AS THIS IS ANOTHER EXTREMELY LATE APEX TURN!**

C) As the road begins to rise, start to turn in gradually. If you're not familiar with the turn, don't accelerate too hard yet. Once you've got it doped out, **GET ON THE GAS AS SOON AS YOU CAN, YOU WILL NEED ALL THE MOMENTUM YOU CAN GET!**

D) As soon as you can see the apex, you should be on the throttle hard. If you're blessed with gobs of horsepower, be judicious - the car may get tail-happy. Spins are fairly common here! Make sure to unwind the wheel and use the substantial runout area to avoid this! **DON'T SCRUB OFF SPEED BECAUSE YOU WON'T GET IT BACK!**

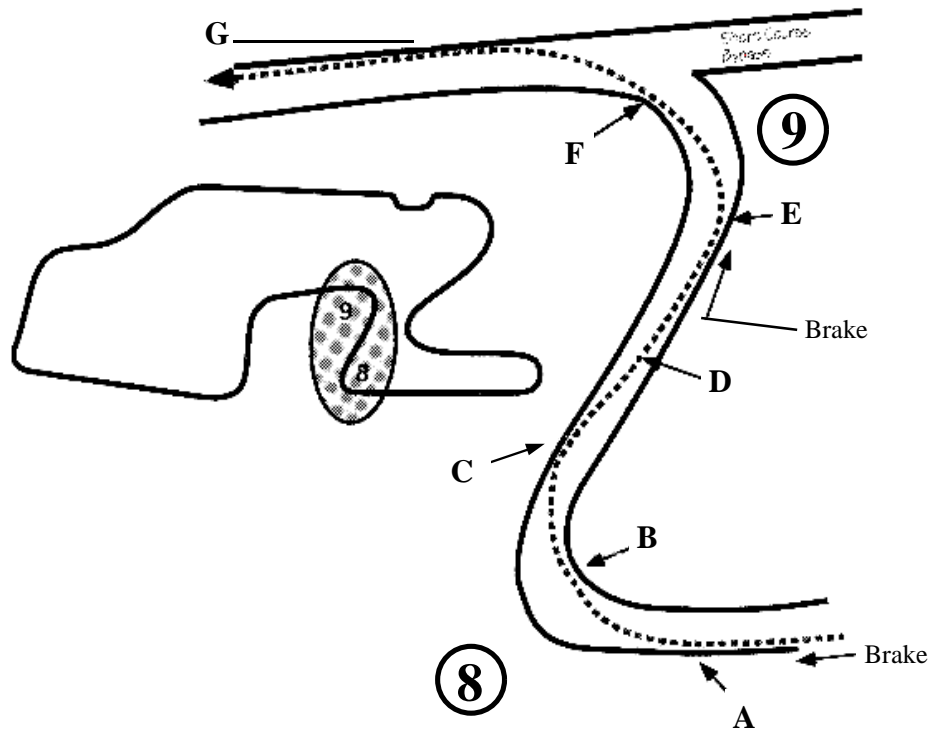
E) Track-out point. The track has been widened slightly here. **Check your mirrors and allow passing!**

**NOTE:** Throttle balance is important exiting the Toe of the Boot, especially if you have lots of horsepower. There are lots of spins here, even in dry conditions!

**Objective:** **YOU MUST CONSERVE MOMENTUM HERE!** No one ever complains of having too much power for this turn. You probably won't gain any speed, just try not to lose too much!

# Turn 8 "The Heel of the Boot"

## Turn 9 "The Off-Camber"



### Procedure: Turn 8, the "Heel of the Boot"

A) Stay to the left, brake in a straight line, downshift to 3rd, and make sure all passing is completed. This turn is similar to turn 1 in that it is a somewhat late and decisive turn-in. The pavement is a little uneven in the braking zone, and if it is wet this area can be VERY TREACHEROUS. Use EXTREME CAUTION until you have assessed the conditions.

B) **Make sure you clip a tight apex.** Accelerate, **unwind**, and track out smoothly and completely.

C) Track-out for turn 8. Begin to transition right (D) but don't arrive at the right until you reach E. This allows a smoother turn-in and better suspension balance.

### Procedure: Turn 9, the "Offcamber"

E) This is another tricky turn because the apex is blind, **very late**, and the track is off camber (falling away). Make yourself brake going up the hill and then throttle early for balance. **DON'T TURN IN TOO SOON !**

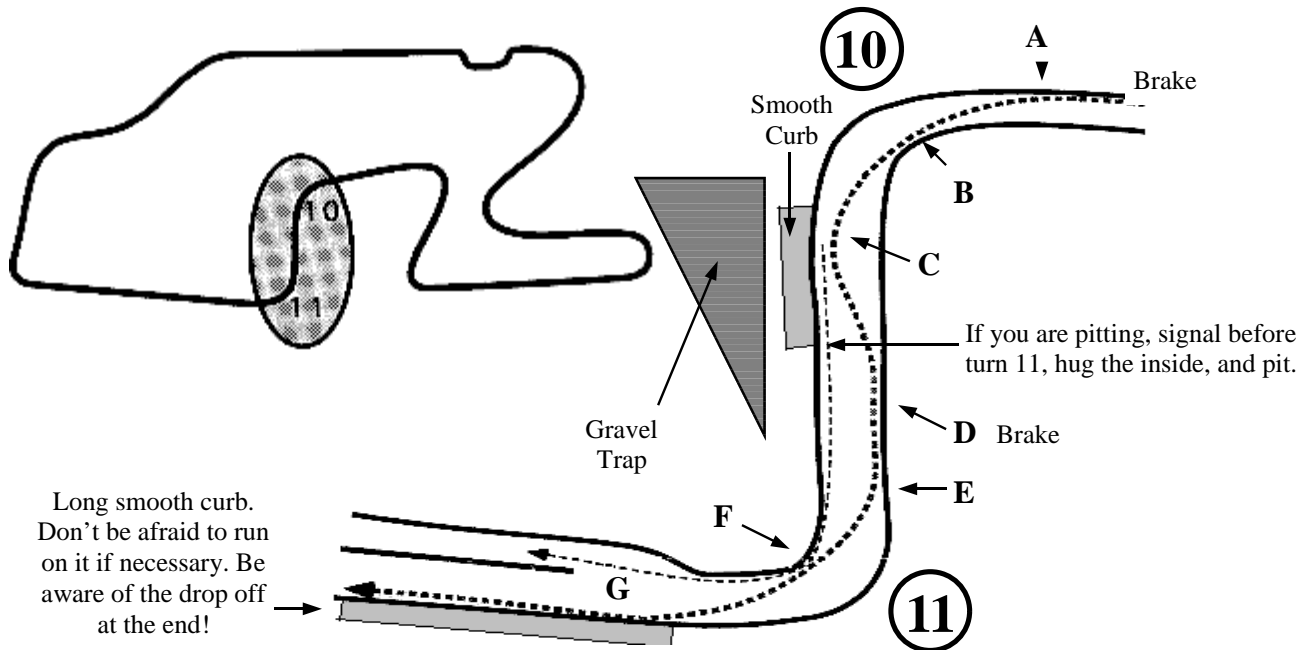
F) Yes, the apex *is* very late! When you find it, accelerate hard and track out carefully.

G) The track seems very narrow here and the Armco's are only 18" from the pavement.  
**THERE'S LITTLE ROOM FOR ERROR... DON'T EARLY APEX AND/OR RUN WIDE!**

**Objectives:** Turn 8 is similar to turn 1, but more than 90°. Enter turn 9 carefully, look for the apex, **but don't turn in too soon.** The Armco jungle will loom large if you miscalculate! This turn is diabolical in the rain. Be VERY careful with your throttle when exiting.

# Turn 10 “The Fast Left”

## Turn 11



### Procedure: Turn 10, "The Fast Left-hander"

- A) Depending on your speed, braking is an option. 4th gear should work.
- B) **This corner is very fast, and you must get a clean, tight apex.** Make sure the car is level and throttle balanced as you turn in.
- C) Track out gently and completely and continue a smooth arc to the left to prepare for turn 11.

### Procedure: Turn 11

- D) Brake in a straight line and look for the apex. This is a good time to check your mirrors. You should already be aware of faster cars catching you up.
- E) Turn in decisively.
- F) Clip a tight apex, give it the throttle, and unwind steadily **all the way** to the track-out point (G).

**Note:** TAKE YOUR TIME WITH TURN 10! The track-out point is very near the horizon line which makes depth perception difficult! Watch for cars pitting. They will be hugging the inside of turn 11. Pass them with caution!

**Objectives:** Turn 10; **don't overcook it too soon!** This turn has been catching people out. **RESPECT IT!** Get as much exit speed from turn 11 as possible. Any extra speed you come out with will carry on with you the length of the straight.