is meant by your term depressant?

A. As I understand it, a depressant will slow down your physical and mental reactions.

Q. Anything else?

A. Not that I can think of right now.

Q. What is it, if you know, most normally prescribed for?

A. Alprazolam?

Q. Yes.

A. Alprazolam is usually prescribed as a tranquilizer.

Q. And what is the purpose of a tranquilizer, if you know?

A. To calm a person in general.

Q. You don't know whether John Brown had a prescription for Xanax or alprazolam, do you?

A. No, sir, I do not know the defendant in this case.

MR. CUMMINGS: No further questions.

MR. RUSHER: Please come down. Could he be excused, Your Honor?

THE COURT: Any objection?

MR. CUMMINGS: None, Your Honor.

THE COURT: Allowed. You may step down.

(Witness left stand.)

MR. RUSHER: State would call Paul Glover.

PAUL GLOVER, being first duly sworn, testified as follows during DIRECT EXAMINATION By MR. RUSHER:

Q. State your name, sir, and your occupation.

A. My name is Paul Glover. I'm a research scientist and training specialist for the forensic tests for the alcohol branch which is part of the Department of Health and Human Services, State of North Carolina.

Q. Sir, testimony was given by the prior witness that the Department of Health and Human Services sets forth regulations for the way the S.B.I. lab analyzes blood. Did you hear that testimony?

A. Yes, I did.

Q. Are you familiar with those regulations?

A. Yes, I am.

Q. What role do you play in that regard?

A. They submit the -- the S.B.I. agents will submit the protocol that they intend to use to me. I review the protocol, review their procedures in the lab, and either recommend that they be issued a permit based on that or not.

Q. Sir, what educational experience do you have?

A. I have a B.S. in biology that I got from Florida State University in 1974 and a Master's in biology from Florida State University, 1978.

Q. Would you tell us please the subject matter of

your specialty? You say forensic tests for alcohol. Describe that please.

A. I serve as the -- I supervise fourteen field staff who are responsible for training the police officers who are certified to do breath tests on the Intoxilyzer 5000. They also are responsible for doing preventive maintenance on those instruments. I do in-service training with those individuals on breath test issues. I also do in-service training with them on blood testing issues that relates to blood testing for alcohol and for drugs.

I review the scientific literature on issues that come up that relate to the testing of blood and breath for alcohol, and blood for drugs, and urine for drugs. I've got a lab in Raleigh. If an issue comes up that has not been dealt with in the scientific literature, then I will conduct research, if I'm able to in my lab, and try to resolve whatever the issue might be.

Q. Sir, what positions have you held since the completion of your formal education?

A. I was a research scientist at Oak Ridge National Laboratory in Oak Ridge, Tennessee, for seven years; research scientist at the National Institute of Environment Health Science in Research Triangle Park for five years, and a research scientist at Burroughs

Wellcome Pharmaceutical for seven years.

Q. What is the time -- your current length of time that you've been on your current job?

A. I've been in this position for five and a half years.

Q. Sir, what publications have you written in this field and what are their titles?

A. I did a study on the effects of impairing substance on the Intoxilyzer 5000 which I presented at a meeting in Stockholm, Sweden in the year 2000. I also did a study on the effects of heat on the blood samples that contained alcohol. In that study we took -- we dosed individuals with alcohol and then drew blood from them, took those tubes and left them in the patrol car for varied lengths of time, and we measured the temperature that the tubes were exposed to over a thirty day period, measuring the temperature every five minutes, and measured the alcohol concentration over a period of time just to see what effects it would have on it. I presented that at annual meeting of an organization of which I'm a member. (Witness coughing.)

Q. Are you having trouble?

A. Yes, I am.

MR. CUMMINGS: Your Honor, we would, with all due respect to Mr. Glover, accept him as an expert in

the area of alcohol analysis or that's probably not the proper term.

MR. RUSHER: Well, Your Honor, I really appreciate it but it won't take but a few minutes.

THE COURT: All right, sir, I'll let you proceed.

(Witness coughing.)

MR. RUSHER: He's in distress.

Q. Do you want to keep going or do you want to take a break?

A. We can keep going.

THE COURT: All right.

Q. Did you conclude your answer?

A. Excuse me.

Q. Had you concluded your answer about the publications --

A. Those were two of the primary ones I did. I've also done some studies where we dose individuals with alcohol in controlled drinking situations and then looked at the dosing and the alcohol level that the individual went to, based on their gender and their size and all of them having been given the same amount of alcohol. Those are the primary studies I've done.

Q. Sir, do you belong to any professional societies?

A. Yes, I'm a member of the International Association

for Chemical Testing and the International Council on Alcohol, Drugs, and Traffic Safety.

Q. Sir, have you previously testified as an expert in courts in North Carolina or elsewhere?

A. Yes, in North Carolina about ninety-five times.

Q. Sir, do you consider yourself an expert in blood alcohol physiology?

A. Yes.

Q. What is blood alcohol physiology?

A. Blood alcohol physiology is where you're looking at alcohol, how it gets in the human body, how it's distributed in the human body, how it affects the human body -- actually that goes into the pharmacology of alcohol -- and in the way that the body eliminates the alcohol.

Q. Are you an expert, sir, in the field of pharmacology?

A. In limited areas.

Q. All right. Please tell us about that.

A. Well, in the pharmacology of alcohol --

Q. What is pharmacology of alcohol?

A. Again, that goes to what alcohol does to individuals at different doses primarily.

Q. Now, Mr. Glover, could you tell the jury please if there has been a period of immoderate drinking how the

body reacts to that?

A. A period of what?

Q. Immoderate drinking of alcohol.

A. Well, the body will eliminate the alcohol at the rate that it's able to do it. If a person has been a chronic abuser, their body will adapt to a certain extent and it will start -- it will be able to eliminate alcohol at a faster rate; but it takes quite a bit of time to get to that point.

Q. Now, are you knowledgeable of studies about rates of elimination of alcohol?

A. Yes, I am.

Q. And have you participated yourself in studies of that type?

A. Yes, I have.

Q. Could you tell us about that please?

A. The way to determine the rate that alcohol is eliminated is by taking a sample from an individual at one point in time, waiting an hour or more, taking another sample, in this case of blood, and measuring the concentration of alcohol in the two samples, determining how much it has changed from one sample to the other over the period of time. There are a number of studies have been published where they looked at about 2500 individuals who were charged with DWI where they took

blood samples from one to two hours apart and measured the rate that they were eliminating alcohol. In that study, they looked at the gender and the age of the individuals to see if they could tell any differences within or between genders or with age differences.

Q. Sir, are you familiar with the legal standards adopted by the North Carolina General Statutes in terms of what constitutes impaired for driving while impaired purposes?

A. Yes.

Q. What is that standard?

A. .08 grams of alcohol per 100 milliliters of blood or .08 grams per 210 liters of breath.

Q. All right, sir. Are you -- were you here throughout the day?

A. Yes, sir.

Q. Have you heard testimony in the court that at Frye Regional Medical Center an alcohol concentration was determined based on the milligrams per deciliters?

A. Yes, sir.

Q. All right, how do those two standards compare with each other?

A. The -- we report it by statute or in the definitions in the statute, it's in grams. The hospital is reporting it in a thousandth of a gram or milligrams.

So the difference in mass, you would just move the decimal and the statute definition is 100 milliliters of whole blood. Hospital uses a deciliter and deciliter is the same as a hundred milliliters.

Q. All right, sir. Is there a mathematical formula that you're aware of that would allow you to convert one to the other?

A. Yes, sir.

Q. From milligrams per deciliter to grams per milliliter?

A. Yes, sir.

Q. All right, sir. Did you hear testimony that the blood tests were based on a serum rather than whole blood at Frye Regional Medical Center?

A. Yes, I did.

Q. Are you familiar with that, sir?

A. Yes, sir.

Q. How does serum compare with whole blood?

A. Well, when you are looking at alcohol, alcohol tends to go to the water containing tissues. It has a high affinity for water. When you look at the amount of water in a volume of whole blood and a volume of plasma or serum, the concentration of water is greater in plasma or serum than whole blood; therefore, the concentration of alcohol is greater in plasma or serum

than whole blood. So what we have to do is reduce the alcohol concentration in serum.

Q. How do you do that, sir?

A. Well again, there were -- studies were done where they took samples and they measured the alcohol concentration in an individual in whole blood that converted the sampling to serum and determined the concentration. They compared the two and came up with a ratio.

Q. And what, sir, is that ratio?

A. Well, the ratio that was determined in the literature is one to 1.15. When we do our conversions in North Carolina, we add a standard deviation to that so we use a conversion of one to 1.18.

Q. Why do you do that, Mr. Glover?

A. It's considered to be -- the bigger the number is, the more it's going to reduce the alcohol concentration. So it's considered to be a conservative way of doing the conversion.

Q. Now, is this conversion ratio generally accepted in the scientific community?

A. Yes, it is.

Q. Now, sir, are you familiar with the metabolite called benzoylecgonine?

A. Yes, I am.

Q. What is benzoylecgonine?
A. That's one of the metabolites of cocaine.
Q. Are there other metabolites of cocaine?
A. There are other metabolites but they constitute a smaller -- much smaller portion.
Q. Sir, the presence of benzoylecgonine in the blood, anyone's blood, could that be there by any means other than to have ingested cocaine or as the other chemist said the benzoylecgonine itself?
A. I know of no way that you would get benzoylecgonine other than ingesting.
Q. Are there practical uses for the chemical known as benzoylecgonine?
A. I'm not aware of any.
Q. It exists primarily as a metabolite of one who has used cocaine?
A. Yes.
Q. Sir, are you aware of studies relative to the use of those -- of those who use cocaine and the appreciation or the use of alprazolam or other benzodiazepine family?
A. Yes, I am.
Q. Tell us about those studies.
A. What the studies have found out is that with cocaine use there is an initial euphoria when cocaine is

used and, within about forty-five minutes to an hour, that euphoria is gone and there's more of what's referred to as a cocaine crash or dysphoria where people just don't feel well. It's just not fun. And there has been an observed trend amongst cocaine users where they will either pre-medicate themselves with benzodiazepines or Valium type drugs, do that ahead of time or sometimes afterward, in order to reduce the bad feeling after the cocaine.

Q. Now, are there other chemicals in the benzodiazepine family other than Valium which you mentioned?

A. There are about -- worldwide about fifty different benzodiazepines. There are somewhere between ten and fifteen that are prescribed in the United States.

Q. Is alprazolam one, sir?

A. Yes, it is.

Q. So based on the study of which you have knowledge, will you find that unusual that there be both the presence of alprazolam and benzoylecgonine?

A. I would not find that unusual, no.

Q. Sir, are you aware of the combined effects of alcohol and alprazolam?

A. Yes, sir.

Q. Would you describe that please?

A. Again, they are both central nervous system depressants that tend to slow reactions. They impair cognitive skills but they are actually synergistic and that means that the two in combination are greater than they are individually. So instead of two plus two equal four, two plus two equals five or six or seven. The effect is greater with the combination of the two.

Q. Sir, in furtherance of your testimony, have you prepared a chart that might be helpful in explaining to the jury how -- what effects there are from these drugs in combination?

A. Yes, I have.

Q. Where is that?

A. I've got it up here.

Q. Sir, I've marked your exhibit State's Exhibit 24. This is a chart prepared by you, sir?

A. Yes, sir.

Q. And in explaining your testimony to the jury, would it be helpful to you to make use of this?

A. Yes, it would.

MR. RUSHER: Your Honor, we would OFFER State's Exhibit 24 into evidence.

THE COURT: Any objection?

MR. CUMMINGS: No, Your Honor.

THE COURT: Let it be RECEIVED in evidence.

Q. Sir, would you stand down in front of the jury and, making use of State's Exhibit 24, tell the jury what the effects of those substances are?

(Witness left stand.)

MR. CUMMINGS: Your Honor, may I re-position myself?

THE COURT: Yes, sir, that would be fine.

A. What I have across the top are the two different drugs in question. These are effects that may be present with certain of the drugs. The first line C-N-S depressant. Both alcohol and benzodiazepine are C-N-S depressants. Cocaine is not.

Q. Sir, what is meant by C-N-S depressant?

A. Central nervous system depressant, something that causes the central nervous system to -- it's -- to be depressed, not as in feeling bad, but its responses are depressed.

Q. Sir, what I'd like to ask you to do is, instead of using your abbreviation, tell us please what the abbreviation stands for.

A. Okay. C-N-S or central nervous system stimulant, cocaine is a central nervous system stimulant. Just as a stimulant, I guess you could say, sort of like caffeine. It gets people stimulated. Is there a synergistic effect with it? You don't always get a

synergistic effect. Sometimes you'll have alcohol and some drugs where there's no effects; some where there's additive; but in this case we have a synergistic effect that's available between alcohol and a benzodiazepine. Again, that means that two plus two adds to something greater than four.

Ataxia means a difficulty in walking, just difficulty in locomotion. If it's stumbling, balance problems, those are potential effects of alcohol and benzodiazepines.

Cognitive impairment we see again with alcohol and benzodiazepine. That simply means the ability of somebody to be able to think. They just can't process as they need to. When you're doing a task, you get a stimulus, a visual stimulus. There's a portion of your brain that will recognize what's going on. Another portion of the brain is then going to formulate a plan how to deal with what's happening and then it communicates to another portion of the brain to take the action. So one thing sees it, passes that information to the processing area, passes that on to the one to carry the activity out. Whenever those communications between the different areas gets slowed down, you get impairment. You're just not thinking as well.

Confusion, that would go with, again, cognitive

impairment. And we have that with alcohol and benzodiazepines.

Depression, alcohol will give you some euphoria and that's a little bit further down here; but ultimately, when the concentration gets high enough, it is a depressant. You can get drowsiness from both alcohol and benzodiazepines.

Dysphoria, with cocaine you get dysphoria and euphoria. Dysphoria means you don't feel good; euphoria means you feel great and that's one of its characteristics. You do the cocaine; initially you feel so good, and then you don't feel so good on the downhill side.

You can get hallucinations with cocaine use. Impair -- alcohol and benzodiazepines will impair divided attention tasks, such as driving. Many, many of the things we do when we're driving are divided attention tasks. You will get in-coordination with alcohol. You get increased reaction time and that means, if you put your hand on a hot burner, it takes more time for that information to go up and more time for you to react and take that hand off.

Memory impairment will occur with alcohol. With cocaine, you can see paranoia. You get reduced vigilance with alcohol and benzodiazepines. You have

increased self confidence for a period of time with cocaine. And finally, you can get visual disturbances with alcohol.

(Witness returned to stand.)

Q. Mr. Glover, are you familiar with the life of cocaine in the bloodstream?

A. Well, the half life of the parent compound is around -- I'm going to say forty-five minutes to an hour. That means you lose half of it in each hour. Half that remains is lost in each succeeding hour.

Q. Mr. Glover, in this case the jury has heard evidence -- assuming the jury shall find beyond reasonable doubt that the defendant was the driver of a truck -- pickup truck at 7:57 A.M. and that blood was drawn from his body at 2:00 o'clock P. M. on the same day, and that the chemical analyst, A. M. Joncich, determined the presence of alprazolam, four one-hundredths of one gram of alcohol per 100 milliliters of whole blood, and the metabolite of cocaine, benzoylecgonine, do you have an opinion as to whether or not at 7:57 A.M. there could have existed in his blood cocaine in its active form?

MR. CUMMINGS: OBJECTION.

THE COURT: Counsel approach please.

(Mr. Rusher and Mr. Cummings approached bench.)

THE COURT: All right, the objection is OVERRULED. You may answer the question.

A. It could have been possible for cocaine to have been present.

Q. Now, sir, if it were present, in your opinion, then at the time of 8:57 A.M. the defendant would have been experiencing the effects of alcohol, cocaine, and alprazolam, is that correct?

A. Yes.

Q. In its metabolite form, benzoylecgonine, does cocaine remain an active substance?

MR. CUMMINGS: OBJECTION.

THE COURT: OVERRULED. You may answer that question.

A. I'm not sure of your question.

Q. Mr. Gaither just told me that in the last question I asked you I used the time 8:57 and, if I did, that was inadvertent. I meant to say 7:57 A.M. Did you understand that at the time I asked the question?

A. Well, I was thinking 7:57.

Q. So the answer you gave was correct and the question I asked was wrong.

A. Yes, sir.

Q. The current question on the floor I have forgotten; but I think it was to the effect is

benzoylecgonine an active -- in its form, is that active or inactive?

A. It may have some limited effects but it's -- seems that I've read that; but it's so -- it's not really significant.

Q. Now, sir, have you made calculations in this case?

A. Yes, I have.

Q. What calculations have you made?

A. I have converted the hospital reported alcohol concentration to a value that would be consistent with the units that we have in our statute. One set of calculations.

Q. All right, sir. The hospital blood -- you're aware that that was drawn at 9:15 A.M.?

A. Yes, sir.

Q. Is that the time you used, sir? Is that the time that you used in your analysis?

A. Well, in doing the conversion, I didn't need to have the time; but that is the time I used for the next set of calculations.

Q. In the calculations that you have -- let me ask you what are the other calculations you have done?

A. I calculated the rate of elimination for Mr. Brown, that is, the rate that his body was eliminating alcohol.

Q. Now, did you do that based on a mathematical formula or you actually -- actually have data that allows you to know his rate of elimination?

A. Well, I have the data and then I applied simple math to that.

Q. What data did you use?

A. I used the reported alcohol concentration that the S.B.I. determined and the alcohol concentration that the hospital determined.

Q. And did you -- what time did you establish or did you make use of?

A. I used the time 9:15 for the collection of the blood at the hospital and 2:00 o'clock for the S.B.I. blood collection.

Q. What other calculations have you made?

A. After doing those, I was able to calculate the concentration of alcohol that would have been in his system at the time of the crash, 7:57.

Q. All right, sir. Now, will you tell us please the results of your calculations?

A. Yes, but I --

Q. Do you have a diagram for that purpose?

A. I have a couple of them. The --

Q. Could I see it please?

A. Sure.

Q. In giving your testimony, sir, to the jury, would it be helpful to you to make use of this?
A. Yes, it would.
Q. And do you have other diagrams as well?
A. Yes, I do.
Q. Could I -- I'd like to mark them all if I may.
A. Yeah.
Q. Sir, tell me -- tell the jurors please what State's Exhibit 25 is.
A. That's a poster that I can show how the hospital plasma alcohol concentration is converted into a whole blood value.
Q. Now, that poster is incomplete. There are blanks.
A. There are blanks I filled in, yes.
Q. What is State's Exhibit 26?
A. That shows -- again, it's fill-in-the-blank to show how to do the retrograde extrapolation which is a term we use, I think, to where we are going to go back in time. Retrograde means going back, doing an extrapolation. So we're going to go back in time to the time of the crash and determine the alcohol concentration.
Q. All right, sir, as to State's Exhibit 27, tell us what it is.
A. That's a graph that has the time and alcohol

concentration and it's another visual way of showing the rate of elimination.

Q. Now, all three of these have blanks to be filled in.

A. Yes, sir.

Q. Did you prepare each of these?

A. Yes, I did.

Q. Would it be helpful in explaining your testimony to the jury to make use of Exhibits 25, 26 and 27?

A. Yes, it would.

MR. RUSHER: Your Honor, we would OFFER them in evidence.

THE COURT: Any objection?

MR. CUMMINGS: No, Your Honor.

THE COURT: Let the exhibits be RECEIVED in evidence.

Q. Sir, would you stand down again in front of the jurors?

(Witness left stand.)

Q. Make use in State's Exhibit 25, 26 and 27 and please explain to the jurors the results of the calculations you have made.

A. To convert hospital plasma to whole blood value, we have to basically do some simple math. First of all, the reported concentration was 177 milligrams per

deciliter. To convert that, we divide that concentration by 1.18 which is a ratio of whole blood to serum that's been established in the literature. That would give us our whole blood alcohol concentration.

So if we take 177 milligrams and divide that by 1.18, it would give us 150 milligrams per deciliter. So we're still not in the units for our statute. 150 milligrams is equal to .15 grams of alcohol per hundred milliliters. So we reduce the amount by dividing by this number and we simply move the decimal three places so it would be .150 in the terms as we use it in the statute.

Q. Now, Mr. Glover, are you saying that the reading reported by Frye Regional Medical Center expressed in the language of the North Carolina General Statutes to be .15?

A. Correct.

Q. That would be at what time, sir?

A. That blood was drawn at 9:15 in the morning. And that's the other -- another point. In order to do the retrograde, we have to look at the time that the blood was drawn. We know that the blood was drawn at 9:15. The crash was at 7:57. That gives us one hour and eighteen minutes. The -- the concentration or the rate that Mr. Brown was eliminating alcohol was determined by

using the hospital value and the S.B.I. value; and so the rate that he's eliminating it is 0.023. 0.023 grams per hundred per hour so that means the alcohol concentration is going down at this rate.

To find out how much alcohol has been lost during this time, you simply multiply this value, one point -- or one hour and eighteen minutes, which is 1.3 hours, times this rate of elimination, and it will give you the amount of alcohol eliminated. When you do the math, what it will give you is that 0.029 grams of alcohol were eliminated per hundredth of blood between the time of the crash and the time of the blood draw.

We have the converted value right here of 0.150. That was from the hospital blood. The extrapolated value, that's what's lost between the crash and the blood draw, is 0.029 and when we add those together and then truncate them, gives us a value of 0.17.

Q. What is 0.17 then?

A. This would be the calculated concentration of alcohol in Mr. Brown at the time of the crash.

Q. And again, the state law makes what figure significant?

A. I'm sorry, I couldn't hear you.

Q. The current law makes .08 significant?

A. Correct.

Q. How does that figure relate to a .08?

A. That's more than twice. Finally, this time line on the bottom, alcohol concentration on the side. I put the concentration that was reported by the S.B.I. at this point. This is the converted value from the hospital at this point and, if you draw a line -- which I'll do -- it shows the -- this line describes the rate of elimination in this particular individual since we have multiple points that we can calculate it and, again, it shows that the concentration would have been at .17.

Q. At the time of the crash?

A. Yes. This vertical line here represents the time of the crash.

MR. RUSHER: Your Honor, we would OFFER State's Exhibits 25, 26 and 27 as Mr. Glover has made amendments to them.

THE COURT: Any objection?

MR. CUMMINGS: No, Your Honor.

THE COURT: Let it be RECEIVED. Members of the jury, at this time I'm going to let you take your afternoon break. Follow each of the instructions that I've given you at previous breaks and take a fifteen minute break.

(Jury absent.)

(A recess was taken.)

(Witness returned to stand.)

(Defendant present.)

(Jury present.)

THE COURT: Let me ask counsel to approach the bench for just a moment please.

(Mr. Rusher and Mr. Cummings approached bench.)

THE COURT: All right, you may proceed.

MR. RUSHER: I'm through with Mr. Glover.

THE COURT: Cross Examination.

MR. CUMMINGS: Thank you, Your Honor.

CROSS EXAMINATION By MR. CUMMINGS:

Q. Mr. Glover, you indicated earlier in your testimony that you were familiar with a study or studies showing the effects of weight and other matters on the loss -- and I don't know if that's the proper term -- of alcohol in the body.

A. The rate of elimination.

Q. Thank you. Rate of elimination. Other than weight of the individual, what other factors would affect that rate of elimination, sir?

A. Well, the weight does not affect the rate of elimination. Gender will affect it.

Q. Okay.

A. Females tend to eliminate about ten percent faster

than males and chronic abusers can have accelerated rates of elimination.

Q. Would the amount of food one has eaten affect the rate of elimination?

A. Not -- not in that situation. There are times when it does to individuals with -- with -- they've given them some breakfast, dosed them with -- actually have alcohol to measure the rate of elimination; but they're looking at very low concentrations of alcohol and they're looking at a narrow ledge of time.

Q. That would be when they received alcohol intravenously?

A. That's to see if actually metabolizing foods causes them to metabolize alcohol any faster. They do see a little increase but it's in a narrow range when they're metabolizing foods.

Q. Would it be fair to say that if that alcohol were ingested after a meal was ingested, then the absorption rate into the blood stream if the same amount of alcohol were ingested by that individual not having any previously?

A. If somebody -- food in the stomach can influence the rate of absorption, okay; but it's limited in its effect. What you typically get will be a change in the route of absorption.

When somebody drinks, what they drink goes into their stomach. There's a valve in the bottom of the stomach called the pyloric sphincter. It opens up to admit the contents of the stomach into the small intestine. When that happened, if there's alcohol there, goes through the walls of the small intestine about the first twelve inches of it. It goes almost straight through. And that's how the majority of the alcohol is absorbed in the body. It's then distributed in the blood.

If there's food in the stomach and you slow down the admission of stomach contents into the small intestine so you've got alcohol hanging around in the stomach longer, then you have more absorption that occurs through the walls of the stomach so it then goes through the walls and then into the blood. So it changes the route that the alcohol takes and it will change the peak or the shape of the peak. If you were given a single dose of alcohol and then plotting it, it changes the route to a certain extent.

Q. Does it change the rate of absorption into the bloodstream?

A. Excuse me.

Q. Does it change the rate of absorption into the bloodstream?

A. It changes it somewhat; but again, you're looking at studies have been done with low doses of alcohol. And you're looking at studies where they call it a bolus dose and that's where you take an alcohol-free person, you take their weight and gender, you calculate what alcohol concentration when you get them to. You mix one large drink and usually it's with fruit juice. They drink the whole thing down about five minutes time because they're trying to get all of it in instantly and, when they do, then they can have a -- basically a single dose of alcohol that they can monitor the concentration as it goes up and down. It's so they see effect then.

Q. Okay. This rate of elimination that we talked about, how is this alcohol eliminated?

A. There's an enzyme --

Q. I guess another way to ask that question. I don't mean to ask yet another question; but where does it go?

A. There's an enzyme in the liver called alcohol dehydrogenase. It breaks down the alcohol into acetaldehyde. That step happens very quickly because acetaldehyde is very toxic. This enzyme breaks down about ninety-five percent of the alcohol that you ingest. The other five percent you lose through breath, sweat, and urine.

Q. When you indicated that you had plotted Mr. Brown's rate of elimination of alcohol in his system, that was based upon two figures that you were given, one being what you calculated his blood alcohol level to be at the hospital at something after 9:00 o'clock in the morning of the 9th of October (sic) and then the subsequent S.B.I. lab report done months later that was from blood taken some five hours later at 2:00 o'clock P. M., correct?

A. Correct.

Q. Now, those are two different tests measured entirely differently, were they not?

A. Yes, they were.

Q. And measured at different times, correct?

A. Yes.

Q. And using entirely different process, correct?

A. That's correct.

Q. By entirely different individuals, correct?

A. Correct.

Q. And some -- I don't know if estimate is the proper word; but there were certain standards used, particularly in the one performed at 9:15 or thereabouts in the morning, to get that figure of fifteen -- let me see where we are -- to get that .15 of blood alcohol level at 9:15 in the morning, is that correct?

A. Correct.
Q. All right. You can't testify that that is -- that was John Brown's absolute, unquestionable blood alcohol reading at 9:15 in the morning, can you?
A. You're referring to the value when I did the conversion?
Q. Yes, sir. That's just yes or no and then please explain if you feel you need to.
A. No, because I had to do a conversion and -- but it is a very conservative conversion and by that, if I used the other numbers, it would have made it slightly higher; but it -- based on all literature and studies that I've seen, it's very reliable.
Q. And if you use a lower number, it would have been lower?
A. Correct.
Q. In indicating that the presence of -- and I won't pronounce it right I'm satisfied -- but the -- strike that. You were present, as you previously testified, when the S.B.I. Agent indicated that he did not quantify the amount of the element found in cocaine.
A. Correct.
Q. Okay. So when you said -- and I think I quoted you correctly -- that that particular trace element could have been -- it could have been possible for

cocaine to be present?

A. It's possible, based on the half life of cocaine, for cocaine to have been present at the time of the crash and not be present at the time that that blood sample was collected.

Q. But it's not your testimony, is it, that cocaine was present at the time of the crash?

A. No, it is not my testimony.

Q. Thank you. And I believe you also said or what I gleaned from several of your cumulative, I guess, answers were that you couldn't say that any controlled substance was in his blood at the time of the accident, correct?

A. Are you asking if I said that?

Q. I am asking if you said that.

A. I don't believe I said that.

Q. All right. Are you -- is it your testimony that you can not say that there was controlled substance in his blood at the time of the accident?

A. Based on everything that I've heard and understood, there were no medications given at the hospital and the alprazolam is a controlled substance and that would have to have been in his system at the time of the crash since it wasn't ingested post-crash.

Q. Then going further, can you say that any

controlled substance that may have been in his blood at the time of the crash had any effect on his behavior? Yes or no, and then please explain it.

A. No, I can't say that it absolutely had effect because I don't know the absolute concentration. I do know that the effects of alprazolam can extend well beyond a day after taking it.

Q. But you have no idea in that it wasn't quantified and you don't know when, if ever, it was taken, correct?

A. Correct.

MR. CUMMINGS: All right. I don't have any other questions, Your Honor.

REDIRECT EXAMINATION By MR. RUSHER:

Q. Sir, in your questioning by Mr. Cummings, he asked you about the actual rate of elimination of alcohol based on the two times that alcohol -- that blood was collected.

A. Yes, sir.

Q. Is there, apart from the actual rate of elimination as you've determined it to be in Mr. Brown's bloodstream, an accepted rate of elimination for adult males that is recognized in the scientific community?

A. Yes, there is a rate that has been published. Again, they did it by looking at about 2500 individuals and calculating their rate and the average value was

.018.

Q. Now, what do you mean that the average value was .018?

A. Well, that some of them had a rate that was higher than point -- that's the amount that their alcohol concentration would go down per hour.

Q. Now, in Mr. Brown's case, you know that blood was drawn at two times so you can establish his rate of elimination?

A. Correct.

Q. Apart from that, there is a nationally, scientifically accepted rate of elimination when those two points of blood draw are not available, is that what you're saying?

A. Well, there's -- there's a scientifically accepted rate that's published.

Q. How does Mr. Brown's actual rate of alcohol elimination compare to the scientific community accepted rate of elimination?

A. It's greater; so he eliminates alcohol faster than typically.

Q. Now, in terms of what your ultimate calculation would be, the fact that he eliminates alcohol faster than those according to the national standard, would that lower or increase your estimate of the alcohol in

his blood at the time of the driving?

MR. CUMMINGS: OBJECTION.

THE COURT: OVERRULED. You may answer.

A. If I use the other value, is that what you're asking, which way would it change it?

Q. No, what I'm trying to ask: You say that Mr. Brown's actual rate of elimination is lower than the accepted rate of elimination in the scientific community, is that correct?

A. No, his rate of elimination is greater or faster.

Q. All right. Then my question is, in terms of your ultimate conclusion, the fact that he has a greater or faster rate of elimination than that rate of elimination which is nationally accepted in the scientific community, would that raise or lower your estimate of his actual alcohol concentration at the time of driving?

A. It would lower it slightly.

Q. Now, sir, you talked to Mr. Cummings about the rate of absorption. Could you tell the jurors what the rate of absorption is, sir, as contrasted with the rate of elimination?

A. There really isn't a rate of absorption. The -- it's all dependent upon how much someone is drinking, how much the volume and the concentration of the alcohol. That's what determines how quickly someone

goes up. I don't know that there have been any studies to really calculate a rate of absorption.

Q. Sir, is alcohol a food?

A. Well, I don't -- it may actually be classified that by FDA. I'm not --

Q. Well, is it digested by the stomach or is it absorbed directly into the bloodstream?

A. It's absorbed directly into the blood and broken down in the liver.

Q. Sir, do you have the ability to calculate the quantity of alcoholic beverage that Mr. Brown must have consumed in order so that his bloodstream would have absorbed such quantity of alcohol as -- for seventeen one hundredths of one gram of alcohol per 100 milliliters of whole blood?

MR. CUMMINGS: OBJECTION.

THE COURT: OVERRULED. You may answer.

A. We do have a formula that we can use to calculate the amount of alcohol in an individual at a given alcohol concentration.

Q. All right, sir. What would that amount of alcohol be?

MR. CUMMINGS: OBJECTION, Your Honor, as to when.

THE COURT: SUSTAINED. If you can just

clarify that.

Q. At the time your calculation shows that Mr. Brown had a seventeen one hundredths grams of alcohol per 100 milliliters of whole blood at 7:57 A.M., then do you have an opinion as to what quantity of alcohol was in his blood at that time?

MR. CUMMINGS: OBJECTION.

THE COURT: OVERRULED. You may answer.

A. I can calculate it. I would have to have his weight.

Q. His weight at the time is stated in his medical records. Sir, would you examine State's Exhibit 23 and notice on the emergency record, weight, 210 pounds. Now, would you use that figure which was stated by his medical records to be his weight at the time?

A. I can -- I can give an approximate number of what I'll say beer equivalents.

Q. All right, sir.

MR. CUMMINGS: I'm going to OBJECT to an approximate number.

THE COURT: OVERRULED.

A. Male at 210 pounds would be around -- would have fully absorbed in their system the amount of alcohol that you would get from fifteen to eighteen beers.

MR. RUSHER: Those are the questions that I

have.

THE COURT: Mr. Cummings.

RECROSS EXAMINATION By MR. CUMMINGS:

Q. Are you familiar with the term scientific method?

A. Yes, sir.

Q. What does that mean?

A. Scientific method means that you -- you have certain procedures, certain things that you follow in your seeking out answers, I guess would be the easiest way.

Q. Would it be fair to say that there are a certain number of controls in place for an experiment to follow the scientific method?

A. Yes, there are.

Q. Things like time of day -- depending upon the research that's being conducted?

A. Certainly.

Q. Time of day, temperature of the room, weight of the individual being tested, just any number of things, depending upon the tests that are being conducted, is that correct?

A. Certainly.

Q. And any time you wanted to -- and why do we use the scientific method? Why is the scientific method used?

A. Because you want to be able to let someone else go back and repeat the same thing, see if what you came up with works the same way.

Q. And if the scientific method is employed and employed correctly, if the same experiment is conducted sometime later by different individuals using the same procedures and protocol, they should get the same result, should they not?

A. You would expect them to, yes.

Q. And in the instance where you're using or employing the scientific method in determining the rate of elimination of alcohol in a particular individual's system, you would measure it at one point in time, would you not?

A. You would.

Q. And then you would measure it sometime later, would you not?

A. You would.

Q. You would have him in the same environment for both measurements, would you not?

A. Yes.

Q. You would have him -- the same quantity of blood drawn both times?

A. Uh huh.

Q. You would have it tested by the same individuals

or using the same machine both times?
A. Yes.
Q. And the purpose of that is to ensure accuracy, is it not?
A. Correct.
Q. This method that you used right here does not employ the scientific method, does it? Yes or no, and then please explain your answer.
A. No, because we don't have the -- we're not using the same method to analyze the blood each time. It's better than having a single sample to work with and doing an extrapolation; but if we had two samples that were drawn by the same person, that were analyzed the same place, it would probably give you a more reliable result. You would prefer -- if you were going to do a study, you would prefer to do it that way.
Q. In the scientific community, a study using this type of procedure would not be tolerated, would it? A study wouldn't be tolerated?
A. Well, there are studies that include things like that where you're looking at data that's collected because it's there. It occurred. You collect that data. You didn't design it to be that way but that's the way it's presented to you.
Q. I understand; but I'm talking about in a study

that you set out to conduct --

A. No.

Q. -- this would not be acceptable, would it?

A. No.

Q. And the reason is, is because it's not accurate as employing the scientific method would make it, correct?

A. It's -- correct, it's not accurate; but when you look at the science that's around it, when you look at the literature, it is not inaccurate. When you look at the results --

Q. It's not as accurate but it's not inaccurate?

A. It's -- in other words, if you look at what has been published and compare it to that, it is not out in left field.

Q. So it's not too far wrong?

A. No, I'm saying that it's -- I'm not saying that it's wrong. I'm saying that it's not out in left field.

Q. Let me ask you this, Mr. Glover: You say that the average rate of elimination, based on the studies, I believe -- correct me if I'm wrong -- that was studying 2500 people?

A. Correct.

Q. Was .018?

A. In males.

Q. In males? Okay. However, in Mr. Brown you

calculated to be .23, is that correct?

A. That's correct. And the .018 was an average value that was derived by taking all the values they got and there was a range and there were people who went up, I believe, as high as a .029. Possibly up into the .03.

Q. So what you're saying is that, based on your calculations, Mr. Brown's rate of elimination is -- let's see, there being .005 difference, is some five eighteenths different -- and I haven't done the math to see exactly what that would be, but --

A. About twenty percent.

Q. Twenty percent, thirty percent?

A. Faster.

Q. Than the average?

A. Correct.

Q. Now, there is a possible explanation for that other than that you've testified to and that would be because some of your calculations are incorrect, isn't that right?

A. Well, my calculations aren't incorrect.

Q. And I stand corrected. You're right. Your math is right.

A. You're saying that the values there might not be correct?

Q. Yes. Is that right?

A. There is always that potential. However, I've not seen anything to indicate that they would be.

Q. It's not proven beyond a reasonable doubt, is it?

MR. CUMMINGS: No further questions.

THE COURT: Any other questions?

MR. RUSHER: We'd like to have him answer the question that counsel asked him.

THE COURT: I'm going to disallow that. All right, any other questions?

MR. RUSHER: No, Your Honor.

THE COURT: All right. You may step down,

(Witness left stand.)

MR. RUSHER: Your Honor, sometimes I miscalculate. To be honest, I've scheduled witnesses for tomorrow morning thinking that we would not move as far as we have.

THE COURT: All right.

MR. RUSHER: I do have an offer that we could make today that is 404(b) evidence. I don't know if Your Honor would like to consider that or not.

THE COURT: All right, members of the jury, at this time I'm going to allow you to take your evening break. Do not discuss the case among yourselves or with anyone else. Do not discuss anything with the defendant, witnesses or attorneys. If anyone attempts