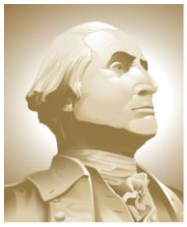

THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

May 1, 2017

Steven D. Rosenfield
Attorney at Law
913 E. Jefferson Street
Charlottesville, VA 22902

Re: Case of Jens Soering

Dear Mr. Rosenfield:

You asked me to review data regarding the serology findings from 1985 and the DNA results rendered by BODE and adopted by the Virginia Department of Forensic Sciences (DFS). You also asked me to review the email/newspaper conversations taking place by people interpreting the various reports/results. Finally, you asked me to provide you with my qualifications to which I am attaching my Curriculum Vitae. To each request, I am providing response in this letter.

You sent to me over 800 pages from the records held by DFS. Most of the records were of disinterest to me because they pertained to matters outside of my expert knowledge or otherwise irrelevant to my review. Very little pertained to the issues surrounding serology and DNA. My primary focus was on the serology findings and BODE DNA materials.

SEROLOGY

Introduction

Serology is a term used in forensic biology to describe testing done before DNA testing and applies to presumptive testing, ABO blood grouping and genetic testing of proteins. My previous laboratory Analytical Genetic Testing Center, Denver CO, was one of the last forensic laboratories in the USA to test for these markers as well as DNA markers. Detection of the clinical or ABO blood types in forensic science is done differently than in the clinical laboratory,

since stains cannot be tested in the same fashion as liquid blood.[1] Serology is now "old school" and is not used in forensic science with the advent of the discovery of DNA.[2] However, you asked me to include in my Curriculum Vitae, my work in serology because forensic science laboratories have not done ABO testing of stains for many years and no longer have employees familiar with the older technology.

Analysis

The crime scene in the Haysom murders revealed a large presence of blood because of the severities of the injuries to the decedents. In 1985, the Commonwealth's serologist, Mary Jane Burton examined those items of evidence submitted to her and for some reason she saved a sample of many of the items provided her, attaching the items to the DFS file. (The word "items" is referred to by law enforcement in identifying the evidence they found and coded to identify where at the murder scene house the evidence was found.) I have reviewed Ms. Burton's written notes, her typed report and I understand from you that she testified for the Commonwealth and was cross examined by counsel for Mr. Soering; her testimony fully supported her typed matrix/chart shown as Exhibit 1 of Mr. Soering's Petition for Absolute Pardon (and the transcript of the testimony is attached to this letter for convenience).

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I concentrated my review of four items that were of particular concern to you and so I will address just those four, but in the context of the other items tested and the DNA results. The items seem to be of importance because if it is established that other people were present at the crime scene, the prosecutor's theory of the case is undermined and the evidence in the case needs to be re-evaluated. The four items are 2FE (FE for Front Entrance), 6FE, 7FE #1 and 23K #1 (K for Kitchen).

Of significant importance, BODE laboratory and DFS have excluded Jens Soering as a contributor of blood found at the crime scene. Mr. Soering has type O blood.[3] However, Ms. Burton determined that

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1 The ABO blood type is also referred to as the primary clinical blood type and is the basis of modern blood transfusion. The body's red blood cells carry antigens that are used for classification of blood type. The ABO blood type identifies which if any of these antigens is present in a person's blood. If a person has the A antigen, he or she is classified as having type A blood. Individuals with the B antigen are classified as type B, while having both antigens results in a classification of type AB. Individuals with type O blood do not have either the A or B antigen.

2 ABO testing is still used medically, before blood transfusions are given, because the introduction of a wrong blood type can cause life threatening reactions.

3 Reports show that decedents Derek Hayson and Nancy Haysom had Type A and AB,

there were five items of type O blood, four of which were on or near the front entrance door. DFS sent you a letter dated August 26, 2016 stating that Ms. Burton's notes showed that item 2FE was identified in Ms. Burton's notes as a blood Type A. Yet, Ms. Burton reported this item as blood Type O on the matrix chart she prepared, and so testified under oath to it being Type O blood. I believe from my review of the DNA findings that 2FE was more likely Type O blood which I will explain later. Nevertheless, 6FE showed no ambiguity and must be concluded to be type O blood. Moreover, the DNA supports 6FE to be Type O without any mixture or contamination. Finally, Ms. Burton identified items 1B (Bedroom), 4FE and 5FE to also be Type O, a total of five items (counting 2FE) to be Type O blood. Therefore, one or more people with Type O blood was at the crime scene and left their blood. If any of these Type O blood stains contained a "Y" chromome, which could not have been obtained in 1985 or 1990, (the time of the Soering trial), then these contributors were male.

For the samples in question there was ample sample size for Ms. Burton's evaluation otherwise she would have noted otherwise and reported too small a sample or a negative result as seen in here results on the 1985 certificate of analysis. Also, the reports from BODE Technology note, for each item tested, there were three swabs available. This at least suggests that there was some amount of blood left over after Mary Jane Burton had completed her tests. Otherwise BODE would not report out any loci with alleles.

Items 7FE #1 and 23K #1, are two items that Ms. Burton reported to be Type AB blood. In order to reach a conclusion that a sample is AB, the scientist must make three cutting of the sample and place one of each cutting into three tubes which contain antigen markers looking to see if either or both the A antigen and the B antigen were present. These two items do not appear to be a mixture or contamination, as I will explain in the DNA section that follows.

Conclusion

I reviewed an article appearing in the Richmond Times Dispatch on September 11, 2016 wherein the journalist interviewed a lawyer who is President of the American Academy of Forensic Science. The lawyer concluded, according to the article, that the 2009 DNA report "cannot conclude that the DNA profile developed came from the type O blood." (Article attached). She reportedly also said that the swabbed samples from the items could contain other sources of DNA "such as skin cells." For reasons I will get to in the next part regarding DNA, the lawyer raises too much speculation. In part, this can be

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respectively, and the biological daughter, Elizabeth Haysom, had Type B blood.

explained because the lawyer did not have the benefit of reviewing the DFS records. I have read the lawyer's email to you where the lawyer offers several different possibilities to explain what the DNA results could mean. Once again, more speculation and less science.

Finally, I reviewed the Memorandum For Record dated September 15, 2016 produced by the DFS staff in summarizing their discussion with you. (All of the DFS Memoranda and summaries are attached to this letter). Toward the end of page one, there is mention that some of the serology testing was faulty because some of the "stains [were] limited." By this they mean to suggest that the stains tested by Mary Jane Burton may be erroneous because she did not have enough sample with which to work. This one statement alone indicates a confirmation bias by the DFS laboratory for several reasons. First, none of the people in the state lab are experts in serology and should not have addressed your concerns. Second, Mary Jane Burton would have reported inadequate sample sizes and either not tested what she had or rendered an "inclusive" or some comparable description rather than just guess at what she found. And third, Mary Jane Burton was a professional scientist and must be presumed to know how to conduct testing for antigens.

Ms. Burton's serology test results are all consistent with what the DNA results reported.

DNA

Introduction

Forensic DNA testing looks at genetic variation in the human body that can be tested on crime scene evidence and known reference samples, since DNA is the same in every cell of a particular subject. Forensic DNA testing cannot determine ABO blood type. It can identify gender, with a reasonable amount of DNA extracted from the samples; a full profile can be detected when sufficient biological material is present. However, when old samples with reduced or degraded DNA are present, the number of loci detected may be reduced (either no results or partial results due to allele has dropped out), also or there may be the possibility of a mixture of two or more sources leading to more than two alleles being found at a given locus. A locus is the place along the DNA strand where a particular marker is located. An allele is the term used for the alternate forms of a genetic marker at a locus. Only loci (plural of locus) that have many alleles are useful in forensic DNA testing. Human beings have two alleles for a single trait, one being inherited from each parent. If they are the same length, there will be only one allele detectable. If there are two different lengths, two alleles will be detected. Most of the genetic markers used in forensic science are not coding regions (genes).

Analysis

I have created a spreadsheet to track the loci and alleles for items tested and for comparison to profiles of Haysom children and Mr. Soering, which I attach to this report. I will also refer to the September 2009 Certificate of Analysis created by the Department of Forensic Sciences (Exhibit 4 of the Soering Petition for Absolute Pardon) as DFS certificate. You asked me to specifically address items 2FE, 6FE, 7FE #1 and 23K #1 and to draw any significance to those items as they relate to your case.

1. Items 2FE and 6E

The DFS certificate contends on page three that the two type O samples (2FE and 6E) and the six type A samples (22DR, 35K, 4DR, 6LR, 7DR, 8DR) all "originated from a common male contributor." This contention is pure speculation unsupported by science based on the ABO blood types of these samples.

The 19 items DNA testable, report out 16 loci. For example, the first item, 10DR, has only 3 fully reported results out of 16 loci. Item 35K has the most reported results: 12 out of 16 loci. For the loci that showed no reported results, it simply may mean that the amount of DNA obtained from the sample was insufficient to detect all of the loci. The DFS certificate shows many loci as identical, but scientifically, there are not enough alleles to say they are the same person. So when the DFS reports consistency with a single male contributor it is misleading since consistency improperly suggests identical or the same. There is no sound scientific reason for calling something consistent with so few alleles. Further, it should be noted that Jens Soering is not consistent with these samples at 7 loci, effectively excluding him as the donor, regardless of their ABO blood type.

Another way to look at this is to look at 10DR, which had only 3 fully reported results out of 16, and recognize that 13 of the 16 loci are unknown. This means there is an 81% level of uncertainty when comparing 10DR to other samples. Even for item 35K—the sample with the most results reported (12 out of 16) and recognize that four alleles are unknown. This means there is a 25% level of uncertainty when comparing 35K to other samples.

Given these high potential error rates (25%-81%), it is simply bad science to speculate about a "common male contributor," who is not Jens Soering. For instance, when comparing 10DR and 35K, the 3 loci of 10DR do indeed match the corresponding three loci of 35K. But that leaves 13 loci uncertain; they might match, but equally well they might not. Further, 10 DR is a female, while 35K is a male, indicating the potential errors in making these comparisons.

The two items of interest here are 2FE and 6FE. 2FE shows results for 9 out of 16 loci; for 7 loci, there are no results. So there is a 43% chance, a different contributor could have left that 2FE. Item 6FE shows results for 5 out of 16 loci; for 11 loci, there are no results. So there is a 69% chance, a different contributor could have left that 6FE. Again, that contributor is not consistent with Jens Soering.

Given the 43% and 69% potential error rates, respectively, left by DNA testing, the only reasonable scientific alternative is to rely on the serology results of 1985. Those serology results show, without dispute, that 6FE has a different blood type than all items but 2FE: Type O. There is nothing in the DNA report to conclude that 6FE and 2FE did not come from the same contributor, that is, none of the alleles in each item has a different allele. Of course, the DNA chart does not prove 2FE and 6FE came from the same contributor, but we know that the serology report showing each is a Type O sample is consistent with each being Type O. There are some who think because scientist Mary Jane Burton reported in her hand written notes that 2FE was a Type A and later reported and testified it was a Type O that 2FE must be Type A, cannot explain why it is not just as proper to claim that since there are no contradictions in the loci and alleles between the two and because there is no dispute that 6FE is type O that 2FE must also be Type O. It should be noted that type O and type A blood are each about 40% of the US European population, and thus not terribly informative.

It is my opinion, that Mr. Soering was eliminated as the contributor of Type O blood at the crime scene. Further, because the DNA report does not prove that a contributor of Type A, AB or B has the same DNA as the item 6FE sample, then at least one or more male contributors, each having a "Y" chromosome and with Type O blood other than Mr. Soering were at the crime scene.

Earlier I had stated that there was no mixture or contamination from someone else. I can make that observation because a mixture would show up as having a third allele present (remember that only two alleles appear at any one locus in a single donor sample) and contamination would likewise show added alleles. There is simply no indication that either a mixture or contamination from another source compromised the DNA certificate.

2. Items 23K#1 and 7FE#1

In the 1985 serology report, these two items tested as type AB. That is Nancy Haysom's blood type. Since DNA testing shows these two samples to have been left by a male (X,Y chromosomes shown under the AMEL locus), the natural conclusion is that these two items were left by a different person than Nancy Haysom: perhaps a male perpetrator who was injured and left his AB blood.

The question is whether 23K#1 and 7FE#1 may, in reality, be a mixture of some combination of different people causing Ms. Burton to mistakenly conclude that these were Type AB blood contributors. Once again, as I stated above in the Serology section and regarding 2FE and 6FE in the DNA section, the DFS certificate shows that there is no reason to believe such a mixture is present. Stated another way, there is no empirical evidence to show that Mary Jane Burton got it wrong. I have reviewed the hand written records of Ms. Burton and nothing there adds to the belief that these two items were inconsistent with her findings of AB Type blood on these items. Note: Sample 13K, in the protein electrophoresis is reported to be PGM 1+,2+,2-, a clear mixture, or unknown source, such that it was certainly possible to find mixtures with non-DNA testing, suggesting it was possible to detect them with DNA, but none were detected.

CONCLUSION

The differing values at loci D3S1358 allow me to state, with a reasonable of scientific certainty that 23 K #1 was left by a different contributor than 10K and 9K. These two different contributors both had type AB blood, but different genders and different alleles at loci D3S1358. I can also state, with a reasonable degree of scientific certainty, that a different contributor than 22DR, 35K, 4DR, 6LR, 7DR, 8DR, based on ABO type, left items 2FE and 6FE.

There is no scientific basis for the speculation that 2FE and a "common male contributor" left 6FE and the other six items. 6FE, for instance, showed results for only 5 out of 16 loci tested. The remaining 11 loci (69%) could easily have different values, indicating different contributors. Given this high level of uncertainty, we must rely on the best science available: the 1985-serology results that, at least for 6FE, are indisputable.

It is not science to guess that missing alleles could belong to one person in order to make the pieces fit the puzzle. Since the DNA results report so few loci, no adverse conclusion can be drawn. Serology may not have been the best science as compared to DNA, but absent a showing that a seasoned and experienced scientist as Mary Jane Burton, who the prosecutor had vouched and got judicially declared an expert witness at Mr. Soering's trial, Ms. Burton's findings are unassailable. Tell a patient who is about to get a blood transfusion that blood typing is not good science and the medical profession would scream.

CONSULTATION FEE

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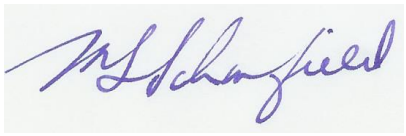

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Moses S. Schanfield, Ph.D.

Item	Source	Human	ABO	PGM	PGM sub	ADA	GLO	AK	ESD	EAP	HP	PEPA
stain	23K#1	+	A,B	nd	nd	nd	nd	nd	nd	nd	nd	nd
stain	2FE	+	O	nd	nd	nd	nd	nd	nd	nd	nd	nd
stain	6FE		O	nd	nd	nd	nd	nd	nd	nd	nd	nd
threshold	7Fe#1	+	A,B	nd	nd	nd	nd	nd	nd	nd	nd	nd
Blood	Derek Hayson	+	A	1,2	2-1+	1,2	1,2	1	1	A,B	1,2	1
Blood	Nancy Hayson	+	A,B	1,2	1+2+	1	1	1	1	A,B	1,2	1
Blood	J.C. Hayson	+	A	1,2	1+2+	1	1,2	14	1	A,B	1,2	1
	Elizabeth Hayson		B		1+,1+2+,1+2-							

Bode	Source	FGA	TPOX	D8S1179	VWA	AMEL	PENTA E	D18S51	D21S11		
	JC Hayson	21 or 22	-,8	13 or 14	-,17	X,Y	5 or 10	12 or 14	27 or 32.2		
	Elizabeth Hayson	25 or 21	-,8	14 or 13	-,17	X,X	10 or 5	14 or 12	32.2 or 27		
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
34A	6FE stain				17,18	X,Y				O	
29A	4DR stain	22	8	13,14	17,18	X,Y			27,30	A	
36A	7DR napkin			14	17,18	X,Y				A	
38A	8DR seat	21		13	17,18	X,Y			27	A	
35A	6LR stain at WR Hayson				17,18	X,Y			27	A	
25A	35K SWABS	21	8	13,14	17,18	X,Y			27,30	A	ssible Father
NJ											
39A	9DR			14		X,Y					
01A	10DR seat				17	X					
04A	11DR seat				17	X,Y					
18A	21DR dining rm				17,18	X,Y					
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
34A	6FE stain				17,18	X,Y				O	
19A	22DR STAIN				17,(18)	X,Y				A	
25A	35K SWABS	21	8	13,14	17,18	X,Y			27,30	A	ssible Father
29A	4DR stain	22	8	13,14	17,18	X,Y			27,30	A	
35A	6LR stain at WR Hayson				17,18	X,Y			27	A	
36A	7DR napkin			14	17,18	X,Y				A	
38A	8DR seat	21		13	17,18	X,Y			27	A	
06A	11LR swabing					X,Y					
40A	9K crust floor			14	17	X,X					
02A	10K floor		8	10,14	17	X,X					
11A	15K crust floor				17,18	X,Y					
21A	23K COUNTER 1				17	X,Y				A,B	
21B	23K COUNTER2				17,18	X,Y					
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
34A	6FE stain				17,18	X,Y				O	
37A	7Fe#1			13,14	17,18	X.Y				A,B	
Blood	Jens Soering	20,21	8,12	10,14	14,16	X,Y	11,13	13,14	28,29		
Blood	Elizabeth Hayson	21,25	8	13,14	17	X,X	5,10	12,14	27,32.2		
Blood	Derek Hayson										
Blood	Nancy Hayson										
Blood	JC Hayson	8 or 9.3	14 or 19	-,11	10 or 11	10 or 11	11 or 12	-,12			
	Elizabeth Hayson	9.3 or 8	19 or 14	-,11	11 or 10	11 or 10	12 or 11	-,12			

Item	Source	TH01	D3S1358	CSF1PO	D16S539	D7S820	D13S317	D5S818		
	2FE	8	16,19	ND	ND	11	12,13	12	confirmed	O
	6FE stain	8,9.3	16,19					12		O
	4DR stain	8,9.3	16,19			11	12,13	12	confirmed	A
	7DR napkin		16,19					12		A
	35K swabs	8,9.3	16,19		11	11	12,13	12	confirmed	A
	22DR stain		16,19					12	confirmed	
	8DR seat		16,19					12		
	9DR seat		16					12		
	10 DR seat		16,19					12	confirmed	
	11DRR seat		19					12	confirmed	
	21DR stain		16,19					12	confirmed	
	6LR at WR Hayson	8,9.3	16,19				12,13	12		
	11LR swabs									
	9K crust floor	7,9.3	14,16				8	12		
	10K floor	7,9.3	14,16				8,11	12	confirmed	
	15K crust floor		16,19					12		
	23K #1		16,19			11	12	12	confirmed	A,B
	23K #2							12	confirmed	
	2FE	8	16,19	ND	ND	11	12,13	12	confirmed	O
	6FE stain	8,9.3	16,19					12		O
	7FE#1							11,12		A,B
Blood	Jens Soering	9.3	16,19	12,14	11	8,12	9,13	12,13		
Blood	Elizabeth Hayson	8,9.3	14,19	11	10,11	10,11	11,12	12		

Item	Source	Human	ABO	PGM	PGM sub	ADA	GLO	AK	ESD	EAP	HP	PEPA
stain	23K#1	+	A,B	nd	nd	nd	nd	nd	nd	nd	nd	nd
stain	2FE	+	O	nd	nd	nd	nd	nd	nd	nd	nd	nd
stain	6FE		O	nd	nd	nd	nd	nd	nd	nd	nd	nd
threshold	7Fe#1	+	A,B	nd	nd	nd	nd	nd	nd	nd	nd	nd
Blood	Derek Hayson	+	A	1,2	2-1+	1,2	1,2	1	1	A,B	1,2	1
Blood	Nancy Hayson	+	A,B	1,2	1+2+	1	1	1	1	A,B	1,2	1
Blood	J.C. Hayson	+	A	1,2	1+2+	1	1,2	14	1	A,B	1,2	1
	Elizabeth Hayson		B		1+,1+2+,1+2-							

Bode	Source	FGA	TPOX	D8S1179	VWA	AMEL	PENTA E	D18S51	D21S11		
	JC Hayson	21 or 25	-8	13 or 14	-,17	X,Y	5 or 10	12 or 14	27 or 32.2		
	Elizabeth Hayson	25 or 21	-,8	14 or 13	-,17	X,X	10 or 5	14 or 12	32.2 or 27		
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
34A	6FE stain				17,18	X,Y				O	
29A	4DR stain	22	8	13,14	17,18	X,Y			27,30	A	
36A	7DR napkin			14	17,18	X,Y				A	
38A	8DR seat	21		13	17,18	X,Y			27	A	
35A	6LR stain at WR Hayson				17,18	X,Y			27	A	
25A	35K SWABS	21	8	13,14	17,18	X,Y			27,30	A	ɔssible Father
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18A	21DR dining rm				17,18	X,Y					
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
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25A	35K SWABS	21	8	13,14	17,18	X,Y			27,30	A	ɔssible Father
29A	4DR stain	22	8	13,14	17,18	X,Y			27,30	A	
35A	6LR stain at WR Hayson				17,18	X,Y			27	A	
36A	7DR napkin			14	17,18	X,Y				A	
38A	8DR seat	21		13	17,18	X,Y			27	A	
06A	11LR swabing					X,Y					
40A	9K crust floor			14	17	X,X					
02A	10K floor		8	10,14	17	X,X					
11A	15K crust floor				17,18	X,Y					
21A	23K COUNTER 1				17	X,Y				A,B	
21B	23K COUNTER2				17,18	X,Y					
23A	2FE	ND	ND	13,14	(17),18	X.Y	ND	ND	27,30	O	
34A	6FE stain				17,18	X,Y				O	
37A	7Fe#1			13,14	17,18	X.Y				A,B	
Blood	Jens Soering	20,21	8,12	10,14	14,16	X,Y	11,13	13,14	28,29		
Blood	Elizabeth Hayson	21,25	8	13,14	17	X,X	5,10	12,14	27,32.2		
Blood	Derek Hayson										
Blood	Nancy Hayson										
Blood	JC Hayson	8 or 9.3	14 or 19	-,11	10 or 11	10 or 11	11 or 12	-,12			
	Elizabeth Hayson	9.3 or 8	19 or 14	-,11	11 or 10	11 or 10	12 or 11	-,12			

Item	Source	TH01	D3S1358	CSF1PO	D16S539	D7S820	D13S317	D5S818		
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	4DR stain	8,9.3	16,19			11	12,13	12	confirmed	A
	7DR napkin		16,19					12		A
	35K swabs	8,9.3	16,19		11	11	12,13	12	confirmed	A
	22DR stain		16,19					12	confirmed	
	8DR seat		16,19					12		
	9DR seat		16					12		
	10 DR seat		16,19					12	confirmed	
	11DRR seat		19					12	confirmed	
	21DR stain		16,19					12	confirmed	
	6LR at WR Hayson	8,9.3	16,19				12,13	12		
	11LR swabs									
	9K crust floor	7,9.3	14,16				8	12		
	10K floor	7,9.3	14,16				8,11	12	confirmed	
	15K crust floor		16,19					12		
	23K #1		16,19			11	12	12	confirmed	A,B
	23K #2							12	confirmed	
	2FE	8	16,19	ND	ND	11	12,13	12	confirmed	O
	6FE stain	8,9.3	16,19					12		O
	7FE#1							11,12		A,B
Blood	Jens Soering	9.3	16,19	12,14	11	8,12	9,13	12,13		
Blood	Elizabeth Hayson	8,9.3	14,19	11	10,11	10,11	11,12	12		