ϵ_ℓ	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
w_{ϵ_ℓ}	1	1	2	3	5	7	9	11	14	16	18	19	20	20	19	18	16	14	11	9	7	5	3	2	1	1
	01234	01235	01236	01237	01238	01239	01249	01259	01269	01279	01289	01389	01489	01589	01689	01789	02789	03789	04789	05789	06789	16789	26789	36789	46789	56789
		01245	01246	01247	01248	01258	01268	01278	01369	01379	01479	01579	01679	02589	02689	03689	04689	05689	14789	15789	25789	35789	45789			
			01345	01256	01257	01267	01349	01359	01378	01469	01569	01678	02489	02679	03589	04589	05679	13789	15689	24789	34789	45689				
				01346	01347	01348	01358	01368	01459	01478	01578	02389	02579	03489	03679	04679	12789	14689	23789	25689	35689					
				02345	01356	01357	01367	01458	01468	01568	02379	02479	02678	03579	04579	05678	13689	15679	24689	34689	45679					
					02346	01456	01457	01467	01567	02369	02469	02569	03479	03678	04678	12689	14589	23689	25679	35678						
					12345	02347	02348	02349	02359	02378	02478	02578	03569	04569	12589	13589	14679	24589	34589	45678						
						02356	02357	02358	02368	02459	02568	03469	03578	04578	12679	13679	15678	23679	34678							
						12356	02456	02367	02458	02468	03459	03478	04568	12489	13489	14579	23589	25678	35678							
							12347	02457	02467	02567	03468	03568	12389	12579	13579	14678	23679	34678								
							12356	03456	03457	03458	03567	04567	12479	12678	13678	23489	24579	34579								
								12348	12349	03467	12369	12379	12569	13479	14569	23579	24678									
								12357	12358	12359	12378	12469	12578	13569	14578	23678	34578									
								12456	12367	12368	12459	12478	13469	13578	23479	24569	34569									
									12457	12458	12468	12568	13478	14689	23569	24578										
									13456	12467	12567	13459	13568	23469	23578	34568										
										13457	13458	13468	14567	23478	24568											
										23456	13467	13567	23459	23568	34567											
											23457	23458	23468	24567												
												23467	23567													

Table II

Quantum States, Energy States and Degeneracy of the 5-Black, 5-White Sphere

MAXWELL DEMON BOTTLE

procedure yields the set of p_l's given by Equation (23), wherein the probability of a quantum state is a function of its energy magnitude (except at infinite temperature).

Equation (20) provides a formalism for assigning p_l's in an objective fashion. We, therefore, need not hypothesize ergodic behavior and have no difficulty establishing the thermodynamics of a five, or, for that matter, a single particle system.

It is interesting to note that the MDB particles behave as "Fermions" that is, like electrons, in that two particles can not occupy the same quantum level. The diameter of the neck of the bottle imposes a "Pauli Exclusion Principle" on the system.

AND IN CONCLUSION: THE MAXWELL DEMON

THE READER MAY have wondered how does one get the bottle back to the state of Figure (1) in preparation for a repeat demonstration. One could, of course, make repeated trials and trust to chance that the initial state would be restored. But how much nicer it would be to call upon Maxwell's Demon to perform the separation for us. It was alleged at the beginning of this article that the Demon is sealed within the bottle. To demonstrate that this is no empty allegation, and to invoke the Demon, one grasps the flask at the base of the neck in a neck-up position as in Figure 2 and swirls its contents using a circular wrist motion. Then the flask is turned to the neckdown position while the swirling is continued so that the spheres are held in the body of the flask by centrifugal force. On reducing the rate of swirling, the spheres rolling inside the flask body follow a spiral path into the neck with the black spheres falling into the neck before the white ones. The "Demon," or whatever other name one may wish to give this gentle deception, lies in the black spheres which are constructed so as to lose momentum rapidly. A "demon" design that has worked satisfactorily is shown in Figure 8. Commercially bottled demons are available, (3). □

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ChE news

ENVIRONMENTAL CONFERENCE AT WORLD'S FAIR

Washington State University will sponsor a three-day conference, "Environment and the Economy: Exploring the Tradeoffs," in Spokane September 5-7 in cooperation with the world environmental fair, EXPO '74.

Program chairman for the conference is Dr. Joseph Brink, chairman of the WSU Chemical Engineering Department. The meeting will be managed by the Engineering Extension Service.

According to Brink, the agenda will focus on the interface between the environment and the economy, the benefits and limits of growth, land use, costs of pollution control, the political framework as it relates to energy, resources, and recycling.

Among the featured speakers will be Donald P. Hodel, Bonneville Power administrator; Dr. Eric Farber, solar energy researcher, University of Florida; Brock Evans, Sierra Club, Washington D.C.; Dr. John McKetta, chemical engineer, University of Texas; and Dr. Roger Cortesi, director of the Washington Environmental Research Center of the Environmental Protection Agency. □