

# DISORIENTED – SOLUTION

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There are two things to focus on at the start of this puzzle: the solution to the logic puzzle describing Scarlet’s journey, and the interpretation of the veiled references in the introductory text. As regards the latter, the ‘notable London auction house’ likely clues either Sotheby’s or Christie’s; that clue, coupled with the phrases ‘**expressly** forbidden’ and ‘**books** it out of town’ and the title ‘**Disoriented**’ suggest a connection to Agatha Christie’s *Murder on the Orient Express*.

With this in mind, we note that the subway map is in fact a *character map* of the main characters in *Murder on the Orient Express*, which is clued by the ‘mysterious **character**’ of the city landmarks. This step is also hinted at by the names of the rail lines:

- DEAD LINE: a connection marked by murder
- DATE LINE: a connection marked by romantic love
- PAL CONNECTOR: a connection marked by friendship
- COMMAND LINE: a connection marked by employment
- BLOOD LINE: a connection marked by family

By interpreting the lines this way, we can identify the characters corresponding to each node.<sup>1</sup> For example, ASPEN SUN RESORT AND LODGE represents Susanne (the Armstrong family’s nursemaid), because the red loop at that node represents suicide. Other easily-identifiable nodes include NORTH TRANSEPT, CHERLIEU ABBEY as Hercule Poirot, who relates to the others only through his friendship with Monsieur Bouc, who appears as SPEAKEASY AND BUNCO DEN.

In each of these examples, a word from the character’s name (or alias) appears as a transdeletion of a word or pair of consecutive words within the matching station name. For example, CHERLIEU = HERCULE + I. (Once this is noticed, the rest of the station/character pairings are simple to determine.)

At last, we turn to the logic puzzle. The introductory text implies that Scarlet’s route consists of at least 22 stops, so any 22-step solution will be optimal. If we assume that a 22-step solution exists, the route must begin with stations (13, 16, 18, 17, 19, 14), which is a good place to start. The full route, plus character pairings and transdeleted letters, is given below:

Station	Character	Letter
1. North Transept, <b>CHERLIEU</b> Abbey	<b>HERCULE</b> Poirot	I
2. Speakeasy and <b>BUNCO</b> Den	Monsieur <b>BOUC</b>	N
3. Happy <b>REPRISE</b> Karaoke	<b>PIERRE</b> Michel	S
4. <b>ASPEN SUN</b> Resort and Lodge	<b>SUSANNE</b>	P
5. Estatuas de Meza (1928-2018) <b>Y SUCRE</b> (1795-1830)	<b>CYRUS</b> Hardman	E
6. Cathedral of <b>ST. ASCETIC</b>	Ratchett ( <b>CASSETTI</b> )	C
7. Track at <b>THE ROTC</b> Campus	<b>HECTOR</b> MacQueen	T

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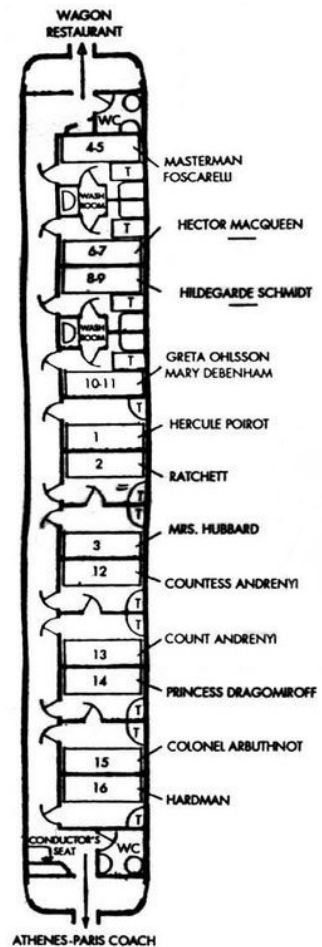
<sup>1</sup>This is an alternate way to first notice the connection to *Murder on the Orient Express*.

Station	Character	Letter
8. Cathedral of <b>ST. ASCETIC</b>	Ratchett ( <b>CASSETTI</b> )	C
9. Macaw and <b>TOUCAN</b> Sanctuary	<b>COUNT</b> Andrenyi	A
10. Lancastrian Ring of <b>COUNTLESS</b> Stones	<b>COUNTESS</b> Andrenyi	L
11. Tattoo Parlor <b>AND EAR</b> Piercers	Linda <b>ARDEN</b>	A
12. Accademia <b>ITALIANA</b>	<b>NATALIA</b> Dragomiroff	I
13. Prominent <b>RADISH LEDGE</b>	<b>HILDEGARDE</b> Schmidt	S
14. Clam's <b>CASINO</b>	<b>SONIA</b> Armstrong	C
15. Gravestone of the <b>MAYOR</b>	<b>MARY</b> Debenham	O
16. Highway to <b>BARTON, UTAH</b>	John <b>ARBUTHNOT</b>	A
17. Cathedral of <b>ST. ASCETIC</b>	Ratchett ( <b>CASSETTI</b> )	C
18. <b>THE RAG</b> Picker Thrift Shop	<b>GRETA</b> Ohlsson	H
19. Q's <b>SPY AID</b> Emporium	<b>DAISY</b> Armstrong	P
20. <b>LOCAL RIFLES</b> Depot	Antonio <b>FOSCARELLI</b>	L
21. <b>MORGAN ARTS</b> Center	John <b>ARMSTRONG</b>	A
22. Sunburnt <b>MERMAN TANS</b>	Edward <b>MASTERMAN</b>	N

The transdeleted letters spell INSPECT CALAIS COACH PLAN, which directs us to a diagram of the passenger quarters which appears in *Murder on the Orient Express* (and/or internet).

The final step of this puzzle involves extracting a phrase using information available on the Calais Coach plan. We treat the bunk numbers (1-16) as indices and index into the only bit of information tied to each character which wasn't specified by Christie: their affiliated station names. Extracting from top to bottom on the diagram gives the following:

Occupant	Bunk	Station	
Masterman	4	SunBurnt Merman Tans	B
Foscarelli	5	LocaL Rifles Depot	L
Hector Macqueen	6	Track At the ROTC Campus	A
Hildegarde Schmidt	8	PromineNt Radish Ledge	N
Greta Ohlsson	10	The Rag PicKer Thrift Shop	K
Mary Debenham	11	Gravestone Of the Mayor	O
Hercule Poirot	1	North Transept, Cherlieu Abbey	N
Ratchett	2	CAthedral of St. Ascetic	A
Mrs. Hubbard	3	TaTtoo Parlor and Ear Piercers	T
Countess Andrenyi	12	Lancastrian Ring of...	R
Count Andrenyi	13	Macaw and ToucAn Sanctuary	A
Princess Dragomiroff	14	Accademia ItalIana	I
Colonel Arbuthnot	15	Highway to BartoN, Utah	N
Hardman	16	Estatuas de Meza (1928-2018)...	9



Plan of the Calais Coach

The phrase BLANK ON A TRAIN (9) references the 1950 novel *Strangers on a Train* and the 1951 Hitchcock film of the same name. The final answer to this puzzle is STRANGERS.

## CONSTRUCTION NOTES

The answer to this puzzle, STRANGERS, is flavorful in many contexts, which gave us little direction in theming and mechanical construction. For this reason, we entertained *many, many* possible ideas for Scarlet's puzzle.<sup>2</sup> Several proposed ideas involved problems from graph theory, which survives in the current puzzle in two places: identification of the characters in the graph without proper labeling (a graph automorphism problem) and the determination of Scarlet's optimal route (a traveling salesman problem).

Use of *Strangers on a Train* as a final extract predates the current puzzle and was an inspiration for the eventual use of *Murder on the Orient Express*, which – as a cheeky contrast – concerns *The-Complete-Opposite-of-Strangers, on a Train*. Christie's *Plan of the Calais Coach* was finalized early in construction. The transdeletion mechanic was chosen much later, as a way to accomplish two objectives: (a) direct solvers to the *Plan of the Calais Coach* and (b) give early confirmation that the association of characters to station stops was both intentional and unique.

The technical construction of the puzzle was complicated by the lack of good transdeletions involving character names. Fortunately, we had a bit of flexibility in choosing the specific route used in the logic puzzle – there are 3362 spanning walks in the graph of minimal length 22, which gave many possible pairings of character names and extract letters. The route presented in the final puzzle was chosen to optimize 'goodness scores' in these pairings across the 3362 possible routes.

The construction of this puzzle would not have been possible without computer assistance enumerating the possible length-22 spanning walks in the graph of character relations. Even though the final estimate 3362 is quite small, the number of candidate solutions grows exponentially before dying down. There are, for example, over 8.4 million candidate walks of length 14. The determination of length-22 spanning walks was done in five stages:

- a. determination of all 8.4 million candidate starts of length 14
- b. reduction to 361 thousand inequivalent 'walk classes' based on equivalent partial progress
- c. extension of these walk classes to 1542 spanning walk classes of length 22
- d. reduction of the 8.4 million walks of length 14 to 34190 walks lying in viable walk classes
- e. extension of these 34190 walks to 3362 spanning walks of length 22

Computer assistance was also used in an earlier version of the puzzle to find an embedding of the character map which minimized edge crossings. (The graph is non-planar.) This was not used in the final version of the puzzle, which uses a subway map aesthetic and is happy to embrace edge crossings.

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<sup>2</sup>The two ideas made it particularly far in development before we switched to the *Murder on the Orient Express* theme. One of these ideas involved peeling back the layers of an increasingly-insane conspiracy theory, and the sort of suspension of disbelief that such a journey requires. The second idea involved the Dumas–Dutil messages, a pair of messages transmitted into space in 1999 and 2003 which slowly build up mathematics, physics, chemistry, and biology from first principles before describing humanity and Earth. You can read more about the construction of the Dumas–Dutil messages here: <https://www.plover.com/misc/Dumas-Dutil/messages.pdf>