THE PUZZLING SIDE OF CHESS

Jeff Coakley

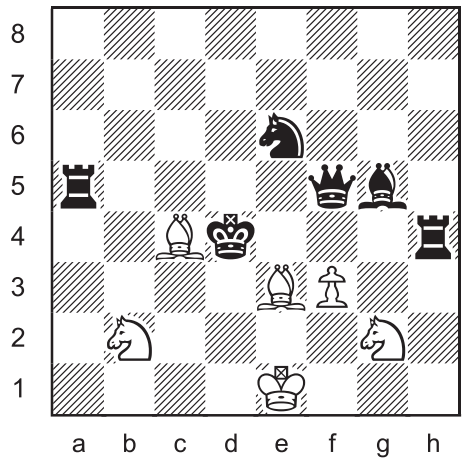
CYCLOTRONIC AFTERLIFE

Two Hours in Space

number 196 November 30, 2020

This column presents eight cyclotron puzzles plus a bonus rebus. Our side theme is the great *space race* and the first man to orbit the earth.

Cyclotron 85



Cycle three pieces so that Black is in checkmate.

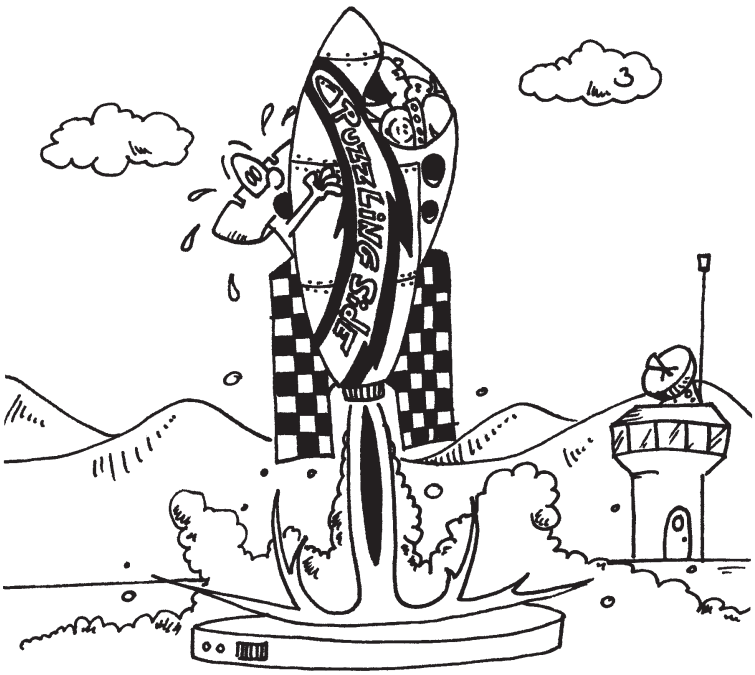
(*See rules on next page.*)

CYCLOTRONS

Switch the position of three pieces so that Black is in checkmate. No actual chess moves are made. The pieces simply swap squares. The pieces trade places in a "cycle". Piece A goes to square B, piece B goes to square C, and piece C goes to square A.

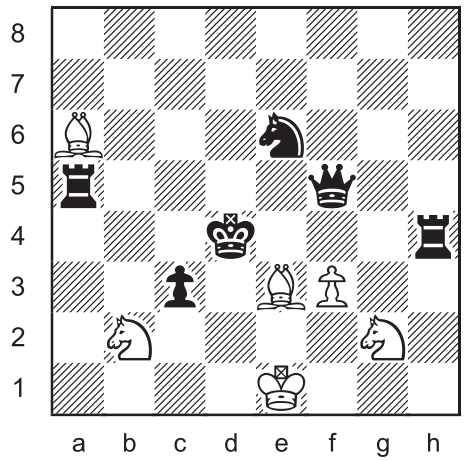
Any three pieces can trade places. Colours do not matter. The cycled pieces can be all white, all black, or a mix of both. Cycling the black king is a common trick.

The position after the cycle must be legal. For example, pawns cannot be on the 1st or 8th rank, nor can both kings be in check.



You probably noticed that the black king was in check in the first position before pieces were cycled. That will be the case throughout this series of problems.

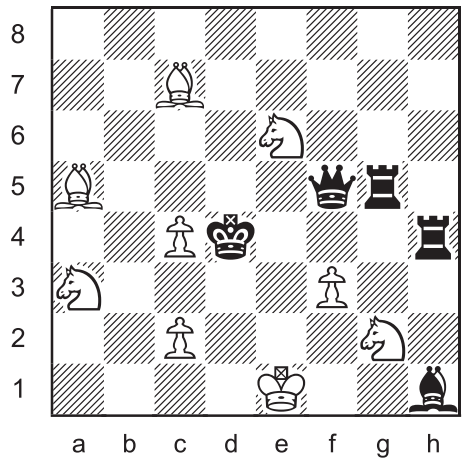
Cyclotron 86



Cycle three pieces so that Black is in checkmate.

One usually unstated rule in cyclotrons is that three pieces MUST be cycled. No fair only switching two (or none).

Cyclotron 87

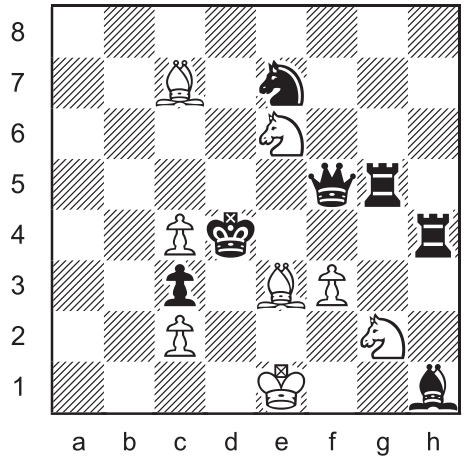


Cycle three pieces so that Black is in checkmate.

Yuri Gagarin

Russian astronaut Yuri Gagarin (1934-1968) was the first human in outer space and the first person to orbit the planet. His historic flight took place on April 12, 1961. The entire voyage, from launch to landing, lasted less than two hours!

Cyclotron 88

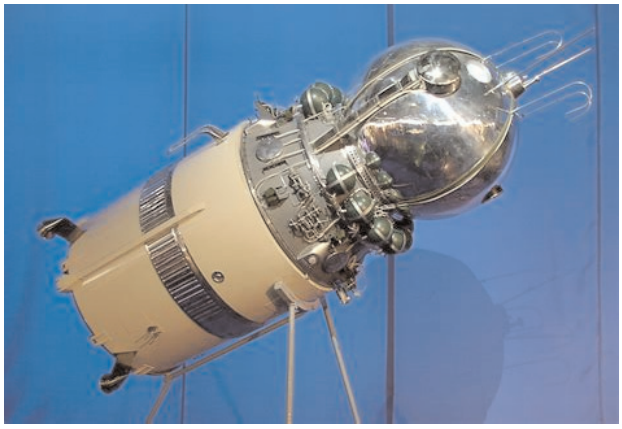


Cycle three pieces so that Black is in checkmate.

Vostok

Gagarin was launched into space atop a Vostok rocket from a base in Kazakhstan. His capsule, also named Vostok (Russian for ‘east’), was completely automated. In effect, the astronaut was a passenger and not a pilot. Uncertain of how humans could perform in outer space, the spacecraft engineers did not want to risk onboard control.

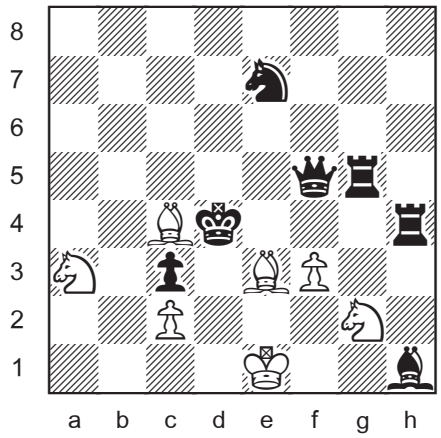
As the rocket lifted off the ground, Gagarin famously said “Поехали!”, variously translated as “Let’s go!” or “Off we go!” The phrase became a slogan for the Soviet space program.



Vostok spacecraft: service and reentry modules

Gagarin and his capsule landed separately in Kazakhstan. He ejected and parachuted on his own from 7000 metres, a fact which the Soviet government kept secret for ten years.

Cyclotron 89



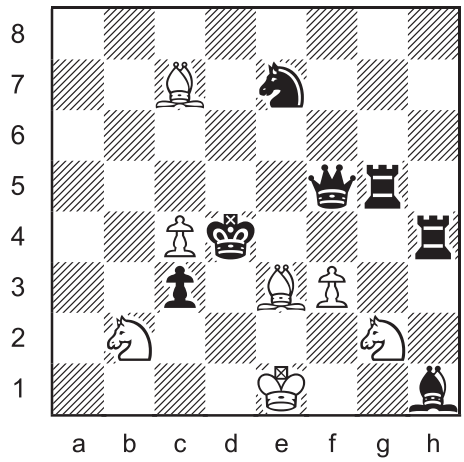
Cycle three pieces so that Black is in checkmate.

SPACE RACE

The *space race* was a battle of technology between the United States and the Soviet Union during the cold war. The goal was to stay ahead of the other country in the exploration and exploitation of outer space. But the competition of the two space programs was more than that. It was also an ideological fight between capitalism and communism, where scientific achievements would somehow prove the superiority of a nation's economic system and way of life.

The "race" started in 1955 when both sides began making plans to put a satellite in orbit around the Earth. The Russians succeeded first with the launching of Sputnik in October 1957. This was an unsettling surprise to the Americans, which led a few months later to the creation of the National Aeronautics and Space Administration (NASA).

Cyclotron 90



Cycle three pieces so that Black is in checkmate.

Air Cadet Gagarin

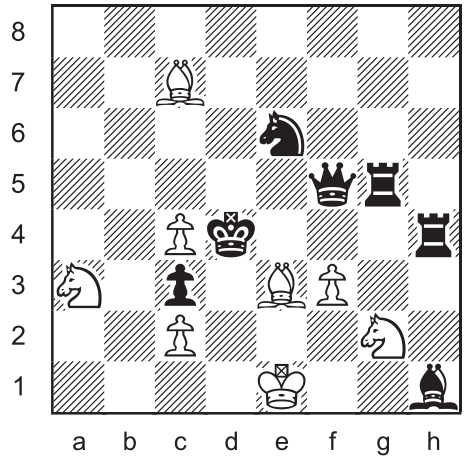
Yuri Gagarin grew up in the village of Klushino, about 200 km west of Moscow, an area that was occupied by the Nazis during World War II. His parents worked on a collective farm. After the war, the family moved to nearby Gzhatsk. The town was renamed Gagarin in 1968 in memory of their native son. Population: 32,000.

As a teenager, Yuri was an apprentice at a foundry near Moscow. He also became an air cadet and learned to fly. In 1957, Gagarin joined the Soviet Air Forces as a fighter pilot. During his orbit of the Earth, he was promoted from lieutenant to major by Nikita Kruschev.

After Sputnik, the next aim of the space race was to put a man in orbit. Gagarin's flight in April 1961 gave the Soviets another major victory.

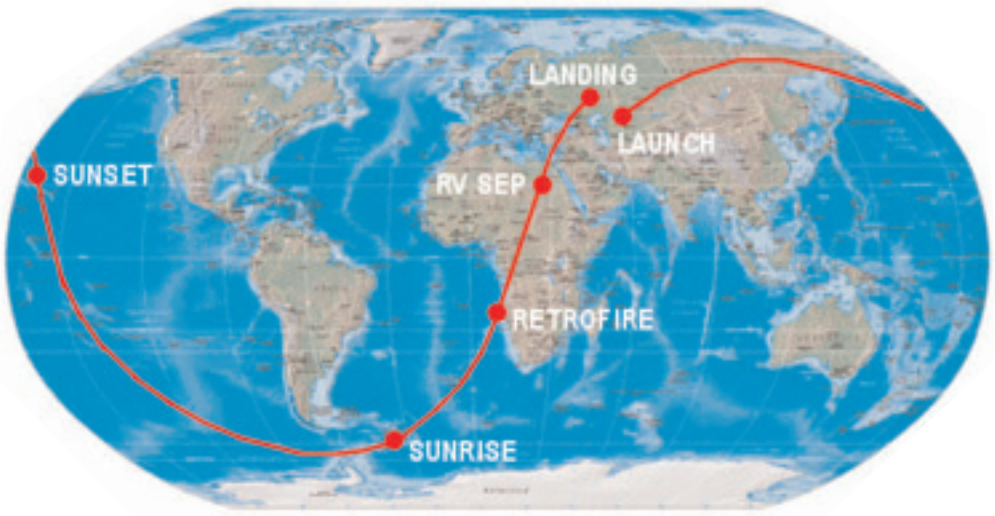
Three weeks later, on May 5, Alan Shepard became the first American in space with the launching of Project Mercury. In the same month, President John Kennedy gave a speech, stating that the United States "*should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth.*" That was to be the ultimate prize in the great space race.

Cyclotron 91



Cycle three pieces so that
Black is in checkmate.

Yuri Gagarin made one orbit of the Earth on his historic two-hour voyage. It was the only space flight he ever made.

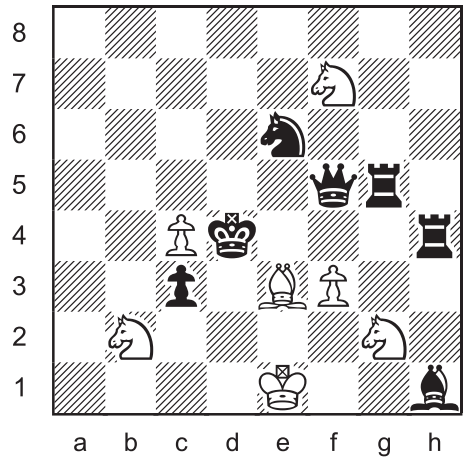


Gagarin's Flight

"*Circling the Earth, I marvelled at the beauty of our planet. People, let us safeguard and enhance this beauty, and not destroy it.*" *Yuri Gagarin*

So what takes longer, an orbit of the planet or solving eight cyclotrons? Here's the final puzzle in the current series. The race is on.

Cyclotron 92



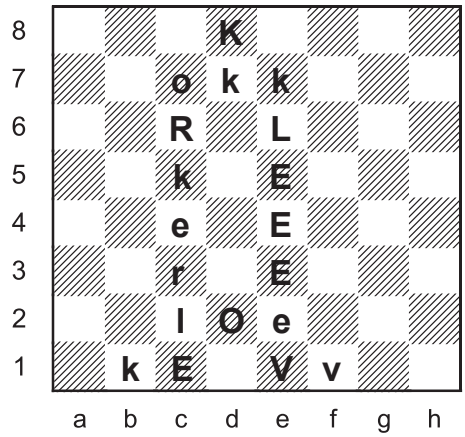
Cycle three pieces so that
Black is in checkmate.

After returning to Earth, Yuri Gagarin was hailed as a national hero. In the months that followed, he became an international celebrity, touring the world on a "mission of peace". His travels around the globe included stops in Canada and England, where he dined with Queen Elizabeth. Predictably, he was not invited to the United States.

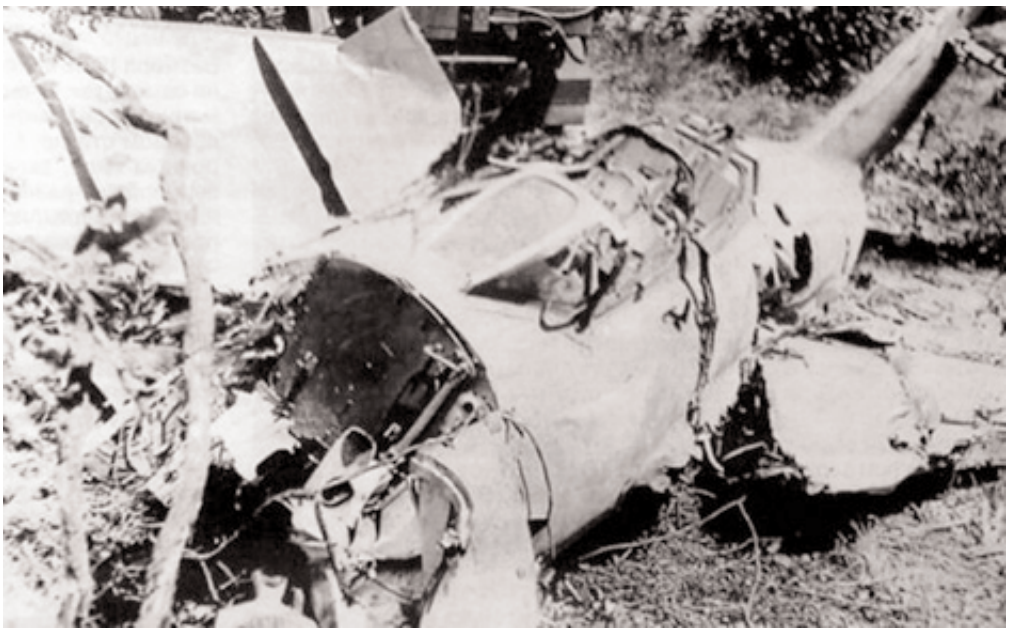
The following rocket-shaped rebus from 2016 was composed for a tourney commemorating the 55th anniversary of Gagarin's flight. The lettering honours the role of Sergei Korolev, the Ukrainian scientist who was chief engineer and mastermind of the entire Vostok mission.

Rebus 62

"Korolev - Grandmaster of Rocket Science"



Each letter represents a different type of piece.
Uppercase is one colour, lowercase is the other.
Determine the position and, if possible, the last move.



Sadly, Yuri Gagarin died in 1968 during a routine training flight when his MIG jet crashed under mysterious circumstances. Another tragedy of the cyclotronic life.

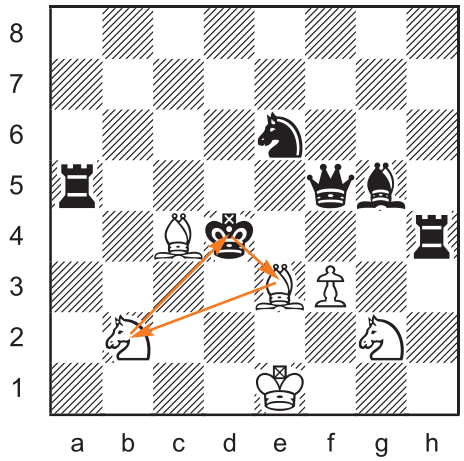
SOLUTIONS

All cyclotrons by J. Coakley. *Puzzling Side of Chess* (2020). Rebus 62 is a joint composition with Andrey Frolkin (2016).

PDF hyperlinks. You can advance to the solution of any puzzle by clicking on the underlined title above the diagram. To return to the puzzle, click on the title above the solution diagram.

Archives. Past columns are available in the *Puzzling Side* archives. For more information on ordinary switcheroos, see column 4.

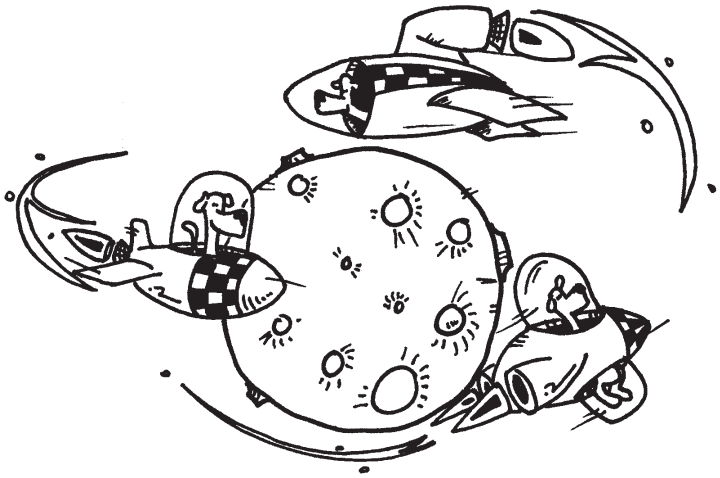
Cyclotron 85



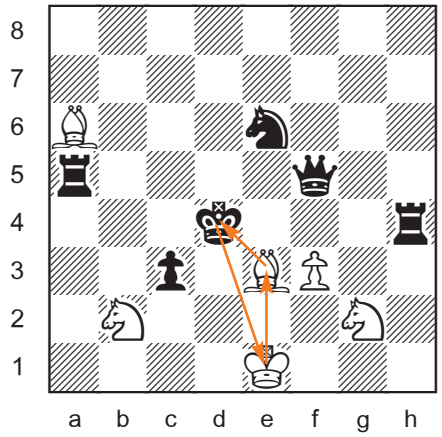
Nb2→d4 Kd4→e3 Be3→b2

Black's king cycles to the square abandoned by the checking bishop.

Yuri Gagarin, a man on a mission.



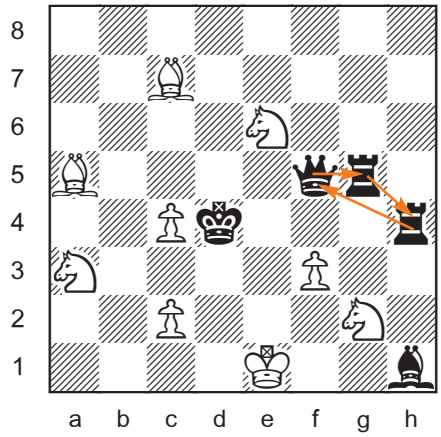
Cyclotron 86



Kd4→e1 Ke1→e3 Be3→d4
Both kings take flight.

Vostok rocket, ready for launch.

Cyclotron 87



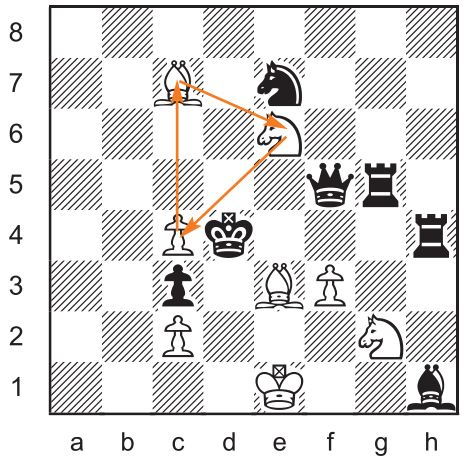
Qf5→g5 Rg5→h4 Rh4→f5

Black would stand in mate in the puzzle position if the black queen could not take the checking knight on e6. The only cycle of the queen that maintains the mate involves both black rooks.

S*ynchrotron*: a cyclotron in which two pieces of the same type and colour are cycled. See column 178. This kind of problem can be solved as a *switcheroo* (Qf5↔Rg5 or Qf5↔Rh4). However, in a cyclotron, three pieces must be cycled.

Yuri Gagarin, a highly decorated cosmonaut.

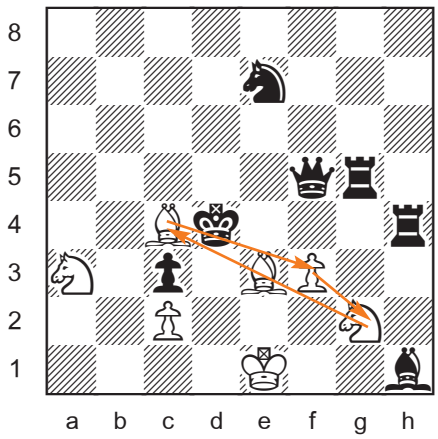
Cyclotron 88



c4→c7 Bc7→e6 Ne6→c4

The white knight (e6) takes over control of e5 from the white bishop (c7) that cycles away to guard c4.

Cyclotron 89



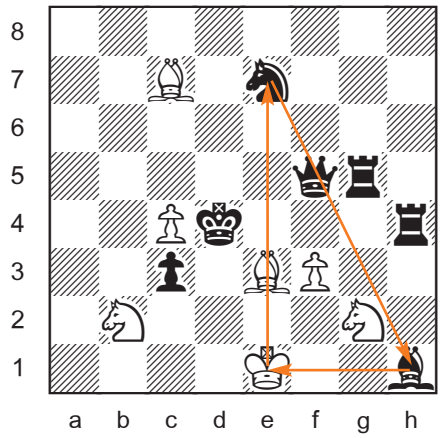
Ng2→c4 Bc4→f3 f3→g2

A tricky shuffle to control e5.

Gagarin enjoyed sports. At college, he was the goalie on a hockey team. He also coached a school basketball team and served as referee. Water skiing was another of his favourites.

His autobiography, translated into English, is called *Road to the Stars*.

Cyclotron 90



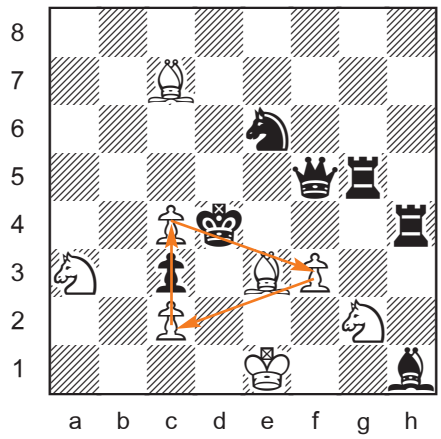
Ke1→e7 Ne7→h1 Bh1→e1

White is mated in the puzzle position.
There is only one cycle that maintains the mate.
And a cycle must be made!

Yuri Gagarin Royal Observatory, Greenwich

Yuri Gagarin will be forever remembered as the first spaceman. The world abounds in tributes to him and his heroic flight. The moon too! Neil Armstrong and Buzz Aldrin placed medals there in his honour.

Cyclotron 91



c2→c4 c4→f3 f3→c2
or
c2→f3 f3→c4 c4→c2

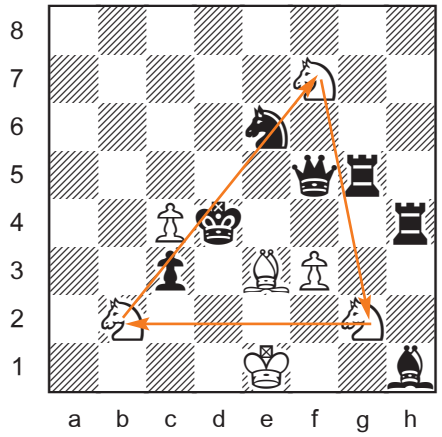
Cyclotronic standstill. Three pieces of the same type and colour are cycled, resulting in an identical position!

Bevatron: a cyclotron in which three pieces of the same type and colour are cycled. A strange occurrence that necessarily has dual solutions since the pieces can swap squares in two different directions.

Like synchrotrons, a bevatron can be solved as a switcheroo (c2↔c4 or c2↔f3 or c4↔f3). In this case, there are also many other switcheroo solutions (Na3↔Nb2 or Bc7↔Be3 or Rg5↔Rh4 or c3↔Ne6 or Ne6↔Bh1).

Warsaw 1961

Cyclotron 92



Nb2→f7 Nf7→g2 Ng2→b2
or
Nb2→g2 Ng2→f7 Nf7→b2

Bevatron 2.0
This time with knights.

Three pieces change places without changing anything.

According to FIDE law 9.2.2: *Positions are considered the same if and only if the same player has the move, pieces of the same kind and colour occupy the same squares and the possible moves of all the pieces of both players are the same.*

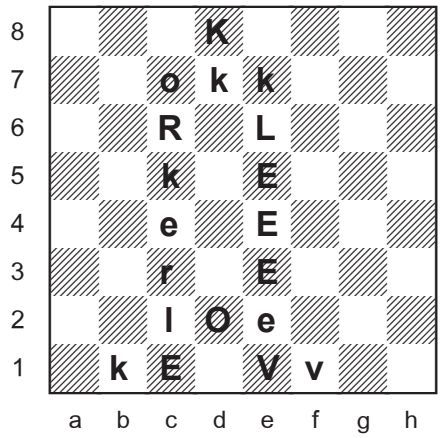
Yuri at home with his two daughters.

Rebus 62

Andrey Frolkin & Jeff Coakley 2016

55th Anniversary of Gagarin's Flight - Tourney

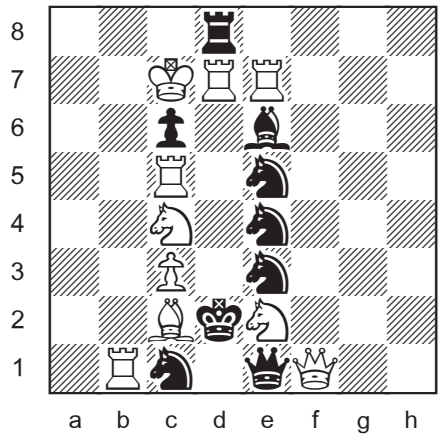
"*Korolev*"



K = rook
O = king
R = pawn
L = bishop
E = knight
V = queen

caps = black

last move:
1.Nd6>c4++



(10 + 9)

♔ = (L,O,R,V) Letters with one uppercase, one lowercase.

♙ ≠ (EKV) On 1st or 8th rank.

V ≠ ♔ Adjacent letters.

R ≠ ♔ If R = ♔

Both kings in check, regardless of piece assignment
The king on c6 is in check by K (♕c5, ♖c5, ♗d7, or ♘e7).
The king on c3 is in check by E (♕e3, ♖e3, ♗e5, or ♘e4).

L ≠ ♔ If L = ♔

Both kings in check, regardless of piece assignment
The king on e6 is in check by K (♕e7, ♖e7, ♗d7, or ♘c5).
The king on c2 is in check by E (♕c1, ♖c1, ♗e4, or ♘e3).

O = ♔

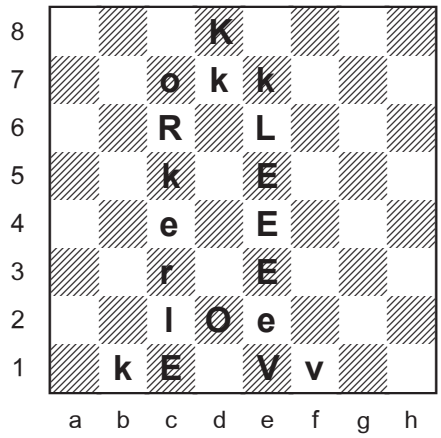
Korolev (*1920s*)

SERGEI KOROLEV

Sergei Korolev (1907-1966) was the "chief designer" of the Soviet space program in the 1950s and 1960s. As the driving force behind the Sputnik and Vostok missions, he was the star figure in the early years of the space race. An untimely death curtailed his plans for landing a man on the moon before the Americans.

Korolev led a fascinating life. A story too long to relate here.

Rebus 62 *continued*



O = ♔

E ≠ ♕ Both kings in check (e2 e5).

One of the kings is in <u>check</u> by E.
If E = ♖ Check (e2).
If E = ♗ Check (e5).
If E = ♘ Check (c4).

K ≠ ♕♗ Impossible multiple checks (d8).

K ≠ ♘ Impossible multiple checks (b1).

K = ♖ The king on d2 is in <u>check</u> by the rook on d7.

E = ♘ The only way to explain a double check by E and K is the discovery **Nd6>c4+**, which may or may not have been a capture.

R = ♗ R ≠ ♕♗ Triple check (c3).

caps = black caps ≠ white Triple check (black pawn c3).

L = ♗ L ≠ ♕ Triple check (c2).

V = ♕

Gagarin and Korolev

Off we go!