Overheard Cams

Alfa Romeo Association
NORTHERN CALIFORNIA

January 2024
Volume 64, Number 1

The Alfa Romeo Association (ARA) is dedicated to the ownership, maintenance, preservation, operation, and enjoyment of the wonderful vehicles produced by Alfa Romeo. The ARA is based in the greater San Francisco Bay Area of California, but welcomes members from everywhere.

Alfa Romeo Association
PO Box 1458
Alameda, CA 94501

www.alfaromeoassociation.org
aranorcal
#alfaromeoassociation

On the Front Cover
Pre-war Alfas at the 1000 Miglia 2023
Photo by Bob Goldberg

On the Back Cover
8C 2300 Spider Zagato at the 1931 Mille Miglia
Photo courtesy of Museo Fratelli Cozzi

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Click photo to send that board member an email

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The Steering Column

Scott Pinsky, President

As the crew comes in to take down the sound stage on 2023 and we're now seeing promo ads for 2024's Hollywood features, it's amazing to think how quickly time flies. It seems like only yesterday when I was writing year-end donation checks to all the groups who sent me 2023 calendars in the mail with their solicitations. (OK, I didn't really, but I thought about it.) And now, here come the 2024 calendars! Time indeed flies . . . What to do?

Just deal with it, I guess, and enjoy the amusements life offers. We were fortunate to have experienced one of those exceptional pleasures a few weeks back at the annual ARA holiday party, held this year at the Basque Cultural Center in South San Francisco. A great crowd was in attendance and there was a fantastic vibe to help us all usher in the season. Not to mention some awesome door prizes!

And now that New Year's has passed, we'll all get another chance to get together in Sunnyvale at the **2024 Annual Membership Meeting** on January 13th, where we'll enjoy Giovanni's pizza courtesy of ARA while hearing about all the activities

that are planned for the coming twelve months. This get-together will be a good chance to learn about what's coming up for the club and also to connect with old friends and hopefully meet some new ones. So, get mobilized for a great 2024 and join your ARA pals in Sunnyvale on the 13th—see details in this issue's calendar and on the website events page!

We're still formulating the schedule for the upcoming year and therefore are always looking for fresh thinking and planning help from ARA members in developing things to do: drives and tours, tech and shop events, social gatherings, and (your idea here). So please don't be shy and let us know what sorts of events you'd be interested in seeing us mount; better still, help us set up and run it!

One thing we're toying with is the idea of pairing up with other specialty car clubs in NorCal for drives and such. We've done successful combined events in the past, such as the Mozart Collection tour with the Pantera Club last year and our annual drive/show with the San Francisco Italian Athletic Club. So, if you have a connection with another club that you think might be a good match for a joint drive, tour, or other outing, don't hesitate to send us the idea for consideration.

Andiamo!

Holiday Party

Kudos to Laurie Delimon who pulled off another fantastic holiday luncheon. Tables in the cheerful room at the Basque Cultural Center were filled with decorations. The gift table overflowed with items—somehow Laurie collected enough to send every participant home with one. The food served at the Basque Cultural Center was very good, as had been reported by people who have attended other events at this venue.

As expected, mingling with club members and their guests at last month's holiday luncheon was fun. Although the luncheon was fully booked, there were only a handful of Alfas in the parking lot despite the decent weather. See the recap later in this issue for photos from the luncheon.

F1 Coverage

With Alfa no longer sponsoring an F1 team, this *Cams* contains the last race commentary and analysis by Jon Gavin. Jon's done an extraordinary job over the past five years reporting about F1 happenings and providing his analysis and insights. I had only watched one F1 race until I started editing Jon's articles, but he turned me into a fan who now watches them regularly. That has likely happened to other readers as well. I do hope to persuade him to write an occasional F1 article in 2024.

14-Inch Tires

Years ago, I bought a set of 185-70/14 Michelins from Costco for my Spider. I just learned that Costco no longer sells tires for 14-inch wheels. Why not? Per an employee 14-inch tires are no longer a "popular size"—meaning that Costco wasn't selling many—so they no longer sell them.

Gasoline Musings

The photo to the right was taken on December 26th in a suburb of Chicago. A few things stand out from the information displayed on this pump:

- The price for a gallon of regular is about $1 lower than on the West Coast. Over the years there have been times when gas prices in these regions were close to parity. Although gas is typically more expensive on the West Coast, there have a few instances when it was more expensive in Illinois.
- The $1 spread between the prices of regular and premium. Typically, it's not that much, though I recall seeing it at that level once before.
- The differing octane ratings for premium, with 91 in California and 93 in Illinois. FYI it's 92 in Washington.

How gas prices are set is a refiner secret, but perhaps someone can explain why octane ratings vary among regions.

Gas pump in Morton Grove, IL (26 Dec 2023)

Where Were the Images?

Did you notice that some images were missing from the November and December *Cams*? It not, you can stop reading now.

This misbehavior happened *only* on Apple computers running Apple's own applications, such as Preview and Safari. Other viewers such as Adobe Reader, Chrome, and Firefox all displayed both months' issues without problem.

What happened? By changing an image compression setting to reduce *Cams*' PDF file size, a viewer bug was encountered. While the 30% size reduction was nice, the change had to be reverted after a few people reported missing images. FYI a bug report has been filed with Apple.

So, if November and December pages were missing images, download those issues again. The images will now appear.

Club Merchandise Available in the ARA Store

Click any photo below to be taken to the merchandise page in the club's online store.
The new club keychain, *top right*, is now available.

ARA Monthly Meetings

The club typically meets at 8 PM on the first Tuesday of each month with some exceptions.

North Bay meetings (Feb, May, Aug, Nov) held at
Aurora Ristorante Italiano Novato
8 Commercial Blvd, Suite A Novato, CA 94949
(415) 382-8488
auroranovato.com

East Bay meetings (Mar, Jun, Sep) held at
North Beach Pizza
1598 University Ave Berkeley, CA 94703
(510) 726-8504
www.northbeachpizzaberkeley.com

South Bay meetings (Jan, Apr, Jul, Oct) held at
Giovanni's New York Pizzeria
1127 Lawrence Expwy Sunnyvale, CA 94089
(408) 734-4221
www.giovannisnypizza.com

ANNUAL MEETING ON 13RD OF JANUARY

ARA Membership

Welcome new members

John Cagliostro, Candace Carpenter
Ken N Dahl, Theresa Dahl
Fabrizio Dangelo, Dan S Fox
David Haugen, Lyle Maasdorp
Bruce Metras, Bruce S Owen

Thank you to renewing members

Paula Barber
Candace Carpenter, Darryl M Carpenter
Peter Gross, Robert D Hugel
Alex Jordan, George F Putnam
Curtis E Raitz, Lalo Ruiz
Thomas W Sigmon, Thomas J Sperow
Scott S Vogel, Austin Zhang

ARA Tech Support Lines

Jim Allen • Nipomo, CA
750, 101, 102 and 106 series cars
(805) 929-6113; evening answering machine

Wes Ingram • Burlington, WA
Spica fuel injection
(360) 707-5701; wing@nwlink.com

Tom Sahines • Milpitas, CA
Giuletta and Giulia cars
Mon to Fri: 12 noon–9pm
(408) 262-6279; tsahines@gmail.com

Remember that our tech team members are volunteers.

Please respect their time and thank them for all they do for the ARA!

2024 Event Calendar

Current/updated ARA event information is posted on the club's website — click the ARA club logo to view it.

January

13	Annual Meeting & Members Lunch [Sunnyvale]
13	DSARC Annual Meeting & Holiday Pot-Luck Dinner [Sacramento]

February

6	ARA NorthBay Members Mtg
18	Green Hills of Earth Tour/Lunch
25	Q1 ARA Board of Directors Mtg

March

5	ARA EastBay Members Mtg
16	West Bay Through the Woods to the Ocean Drive

April

2	ARA SouthBay Members Mtg
6	DSARC One Day Driving Tour
20	Spring Fling South Bay Drive

May

7	ARA NorthBay Members Mtg
11	ARA-SFIAC Tour and Lunch [SF]
12	Q2 ARA Board of Directors Mtg
18	One Lap of Marin
28-Jun2	AROC National Convention/ Tours [Petoskey, Michigan]

June

4	ARA EastBay Members Mtg
5–15	AROC Goes to Italy #7
27-30	Northwest Classic Rally [Oregon]

July

2	ARA SouthBay Members Mtg
20	One Lap of South Bay Drive
tbd	Summer Party [Sturgeon's Mill?] [tbd]

August

6	ARA NorthBay Members Mtg
11	Q3 ARA Board of Directors Mtg
11–18	Monterey Car Week +++
17	Concorso Italiano
17	Post-Concorso Dinner [onsite @CI]

September

3	ARA EastBay Members Mtg
7	East Bay Drive [tbd]
20-21	DSARC Overnight Driving Tour [tbd]
29	All Italian Day Car/Motorcycle Show [SONC benefit event!]

October

1	ARA SouthBay Members Mtg
18–20	AROC Goes to USGP COTA [Texas]
20	Members Lunch Social [tbd]

November

5	ARA NorthBay Members Mtg
16	Patrick Ottis Shop Tour [tbd]
17	Q4 ARA Board of Directors Mtg
21-23	USGP LasVegas [Nevada]

December

8	ARA 2024 Holiday Luncheon [tbd]

2024 Monthly ARA Member Meetings

- Location, registration, and speaker information vary by meeting.
- Updates will be posted in both future issues of *Cams* and on the club's website, but please check the website for the latest info about an upcoming meeting.
- Some months may have two meetings running concurrently in different regions.

January/April/July/October

South Bay Membership Meetings [ARA]

Tuesday evenings*: January 13th [* lunch], April 2nd, July 2nd, October 1st

Location: Giovanni's New York Pizzeria, 1127 Lawrence Expwy, Sunnyvale

Registration is not required.

Questions? Please contact Kurt Delimon at kurt@alfaromeoassociation.org.

February/May/August/November

North Bay Membership Meetings [ARA]

Tuesday evenings: February 6th, May 7th, August 6th, November 5th

Location: Aurora Ristorante Italiano, 8 Commercial Blvd A, Novato

Registration is strongly encouraged but not strictly required.

Questions? Please contact J. Hutson Hart at memberships@alfaromeoassociation.org.

March/June/September

East Bay Membership Meetings [ARA]

Tuesday evenings: March 7th, June 6th, September 5th

Location: North Beach Pizza, 1598 University Ave, Berkeley

Registration is not required.

Questions? Please contact Ed Adams at edonadams@gmail.com.

Event Details

January

ARA Annual Membership Meeting and Lunch

13th (Saturday) 11:30 PM – 3:00 PM

Location: Giovanni's New York Pizzeria, 1127 Lawrence Expwy, Sunnyvale

We will have our traditional State of the Club presentation and a fabulous Italian feast all courtesy of your Club. Please drive your Alfa and show it off in the parking lot before lunch, and we'll try to provide for lovely weather between the rains.

Questions? Please contact Scott Pinsky at president@alfaromeoassociation.com

DSARC Post-Holiday Annual Meeting and Pot-Luck

13th (Saturday) 5:00 PM – 9:00 PM

Location: Italian Cultural Society of Sacramento, 6821 Fair Oaks Blvd, Carmichael

We will have our first meeting of 2024 at the Italian Cultural Society, and this will be a meeting to plan events for the year. A big plus is that the Italian Cultural Society has a big parking lot where we can showcase our cars.

All attendees must RSVP to Mary Ann with information about what they are bringing for the pot luck dinner.

RSVP via email to Mary Ann Dickinson at maryann@dickinsonassociates.com

Event Details

February

Green Hills of Earth Driving Tour and Lunch [ARA]

18th (Sunday) convene at 9:00 am; drive off at 9:45 am

Start Point – Starbucks Novato Vintage Oaks Shopping Center, Novato

Drive with us on the interesting and challenging roads in and among the verdant green hills of Sonoma and Napa Counties. Return route will be optional and interesting back through the Sonoma County hills and through Petaluma back to Novato.

Printed maps and turn-by-turn directions will be provided — remember to bring your smart phone and charger. This is a rain-or-shine drive, so plan accordingly, [check your tires, brakes, and wipers].

- You **must** come to the starting/staging point for an up-to-the-minute route update, driver's meeting, and to confirm your lunch registration. Again this year we are working on a pre-planned group lunch option.
- As always you may make your own arrangements for lunch in Calistoga at the halfway point, instead of the organized group lunch, [details to be provided on our website and in future Cams updates].

We are planning to gather post-event in Novato back at the start point with folks who would like to, weather permitting, at Moylan's Brewing Company, inside or on their outdoor patio, [no sign-up required].

Please click here to register.

Questions? Please contact Hutson Hart at hutsonhart@comcast.net

Holiday Luncheon

Photos by Bob Goldberg and Kurt Delimon

David Szeto arrived in his 1960 Giulietta Spider Veloce

Kurt & Laurie Delimon with raffle prizes collected by Laurie

Paul Vuksich is pleased with his raffle prize


SONC guests Sheena, Angela, Christy


Club President Scott Pinsky


Tris Thomson, Maureen & Andre Adamski


Sean O'Donoghue and Olivia Herriford kept their hats on


Wesley Wong in festive attire

Automatically Perfect

Gordon Carter

My name is Gordon, I live in Southern Victoria, Australia. I always wanted a classic Alfa Romeo, but for a long time I couldn't afford one. About 10 years ago I set my sights on a Berlina 2000. I had one in the late 1970's, my first car. I sold it after having it for two years as I lost my job and couldn't afford the payments. I regretted selling it and vowed that one day to buy another Berlina and own it outright from the start.

Many years passed and I began looking for another Berlina in 2012. I had my heart set on an automatic transmission Berlina in great condition. By 2012, Berlina 2000's in such condition were scarce. A couple of manual transmission models came up, but I had my heart set on an automatic. Automatic transmission Berlinas were very scarce, considering that only about 2,200 were made, and only a few of those in the right-hand drive form.

For years I kept looking out for one online, but only the occasional manual came up. Well, eventually my persistence paid off. Early in 2022 I saw one advertised in Sydney, New South ales. It was being sold by Classic Throttle Shop, the biggest dealer of fine classic cars in Australia. It was for sale at $75,000 Australian. The pictures looked great and I made enquiries. I called the Alfa Romeo specialist in Sydney who serviced the vehicle. He assured me that it was a magnificent automatic Berlina in excellent condition. I also called the previous owner of the car in Melbourne. He had looked after the car and maintained it meticulously. It had a new engine, transmission rebuild, new paint job in the original color Beige Cava.

I decided to take it further, and after several phone calls and emails with the Sydney dealer, I negotiated an offer of $70,000 (roughly $47,000 US), which was accepted. The contract was mailed fast post to my home in Victoria. I signed it, sent it back to the dealer, and transferred the money to the dealer. The dealer arranged for a good transport company they use to deliver it to my home. This cost $1,200 Australian but it was worth it. It arrived two days later without a scratch. It was beautiful.

The car came with the original logbook, service records, complete parts manual, and old magazines featuring Berlina 2000 road tests. The car sat in the garage for two weeks as it was uninsured and unregistered. The first thing I did was to arrange full insurance with a company that specializes in insuring older, classic cars, at a cost $300 annually. The last owner told me it had no rust; that had been taken care of during the repaint. I contacted an Alfa Romeo specialist mechanic in my town. I told him to go over

the car thoroughly from top to bottom and fix every flaw he could find, no matter the cost. I obtained a permit from Victoria Registration and Licences to take the car to him unregistered. The mechanics did find a few minor flaws, nothing major at all. They were amazed at the overall superb condition of the car. A few parts were ordered from Italy that could not be sourced within Australia. These took several weeks to arrive. Meanwhile, the car was fully serviced including all fluids, spark plugs, wheel alignment, all filters, carburettor service, camshaft timing, distributor cap and rotor, valve clearance check, remove front and rear suspension, and check-over. Over 30 hours labor in all. They had the car for eight weeks. Total cost was $7,000 Australian. I was hap-

py to pay it as it's a rare and special car. A great car was made an even better car. The mechanic is an Alfa Romeo specialist who loved working on it. He put in several more hours that he did not charge for just because he loved working on it. An honest man indeed. I took home a flawless Berlina. I am glad i don't have to take the car to an Alfa specialist in Melbourne. I have one here in my town.

Next, I joined the Victorian branch of the Australian Alfa Romeo Club. Because the Berlina is an older car, I was able to register it as a classic. This exempted me from paying Stamp Duty on the purchase price, saving over $3,500. Being a club member I paid $120 registration, which permits me 45 driving days per year. I must fill in a logbook before I drive it in case the police stop me to check my logbook. If I am caught without the logbook entry made I could incur a large fine. So, I take it out for an hour's drive every two weeks. My Fiat 500 is my main runaround town car.

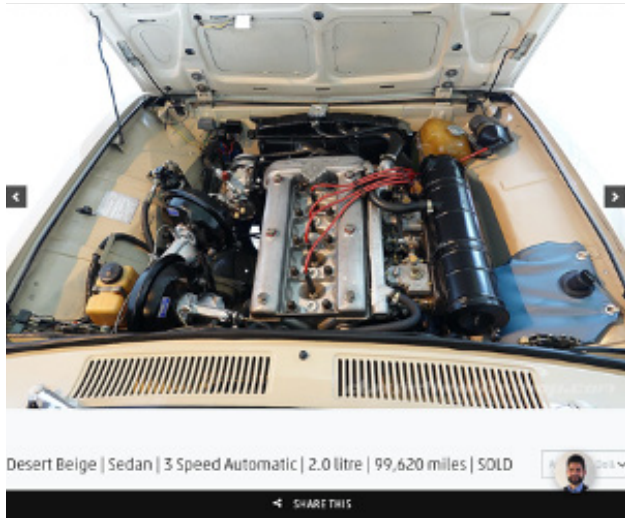
The Berlina drives beautifully, the ZF automatic transmission is so smooth that I hardly feel the gear changes. At 100 kph the engine "sings." I cannot go faster than that by law. I have been spoilt with power steering. The Berlina doesn't have it, so the steering seems a bit heavy. I was considering having power steering installed. I have been strongly advised not too as it would take away from the car's originality and drop the value by a considerable amount. So no power steering. I have also been advised not to use the manual choke when starting the engine as it will foul the carburetors.

I am the fourth owner of the car as far as I can tell. I am very proud of it. It's probably the only Berlina in my town of 250,000 people. Many people have never seen one and it is a head-turner when I am stopped at the lights. The previous owner is an Italian immigrant. He told me that in Italy the Berlina was considered the poor man's limousine! So that's my Berlina story. I hope that you enjoy it!

Care and Feeding of an Alfa Sedan

A few thoughts here on how to treat your Alfa sedan. Mostly not Alfa-specific.

Drive it regularly, and when you do get it fully warm. One thing that wears a car



out, ironically, is non-use. Fluids, seals, system need to work and be lubricated to remain functional. Brake and clutch seals, engine seals, all need use to remain supple and working well. To keep internal engine, trans, diff corrosion at bay, run it long enough to get all the fluids fully hot, to burn off moisture and condensation, and to rotate all the moving parts to get oily.

Use quality fluids and parts. If you can use it, synthetic oil is way better than regular oil. Some old seals may not be compatible, and anecdotally older engines can leak more on synthetic oil because the "molecules are smaller" and leak out easier. But synthetic oil lubricates better, clings better, and can stand much higher temps without breaking down. On most of these engines, use a classic oil with zinc, or add ZDDP if

not. Your tappets and cam lobes will thank you. Add at each change.

Change fluids regularly. For regular oil, 3000 miles is the interval of oil and filter change. For synthetic it's more like 7500 miles, but not sure I could do that on an old Alfa. If you don't put on a lot of miles, change annually. Diff and trans, not so frequently but check it annually and change maybe every five years. Antifreeze and brake fluid are recommended to change every two years. No one does but at least calendar it a few times per decades. DOT4 is my preferred brake fluid. I tried silicone and it's not as "oily," has more friction. It doesn't absorb moisture, which regular fluid does, but moisture still gets in the system from the air; it remains separate and corrodes cylinders.

For drum-brake cars, you really must exercise the brakes regularly, getting them fully warm, to avoid stuck pistons and seals. Drum brakes are a regular maintenance item. Look at the cylinders from time to time, do they show calcified gunk and/or drips? They can be both leaking and stuck firmly at the same time! Stay on top of them to be safe.

Pay attention with all your senses when driving. Any smells or feelings that are different? If so investigate. Look under the car, are there puddles that differ from normal? Investigate. Check your fluids regularly, based on how quickly your car goes through them. You'd be amazed how many folks ruin engines, running out of oil. I'm guilty of this myself on a car that leaks and/or burns, which most old Alfas will.

Keep the weather out! Check your door, window, trunk seals for leaks. Water getting into the car will rot it from the inside out. Windshield seals, door seals will admit water if not seating properly, then the water sits at the low point and eats away at the steel. Trunks are especially prone to this, the spare tire well and ledge around the gas tank rust away. I've seen a Giulia TI gas tank fall out due to this, no joke.

Fix stuff. When something goes awry, fix it. You don't want issues to pile up til they overwhelm you and the car. One or two things OK, you can handle that. But half a dozen things, now the car's becoming undriveable. Then it sits, and rots; soon a junker.

Enjoy the car. I know a fair number of folks who don't use their old Alfas, first want to get them to some perfect state. I say get the car usable, drive it and sort out as you go, if that's possible. For me, these cars are all about driving. So use it! It's hard to find the time to make it perfect, so get it to a manageable state and then drive and use. That can be tough if you're not handy yourself, and the car would need to go to the shop for repair.

Seek help when needed. The clubs, AROC and ARA, are full of helpful folks and tech hotlines when you are over your head. And if you haven't poked around on the AlfaBB online, it is one of the best one-marque

sites there is. Alfas folks are generally friendly, helpful, and reasonably capable, and there are experts in every area just waiting to answer your esoteric question. Plus, parts and cars for sale.

Be realistic. Have cars, in a sensible number, for the life you lead. If one sedan is what you can handle in your chaotic life, fair enough. If projects line the garage and you can keep on top of them all, good for you. But know what makes sense. I've had at time 13-14 cars, and that's pretty nuts. I've scaled back to two permanent Alfas (Super and GTV) and projects cars that pass through. My life is calmer and more manageable, not to mention the money I'm saving on insurance, storage, DMV fees, therapy. *Cams*

Reprinted with permission from the *Berlina Register* Newsletter No. 52 (January 2023).

Spider Names From 1966 to 1993

Bob Goldberg

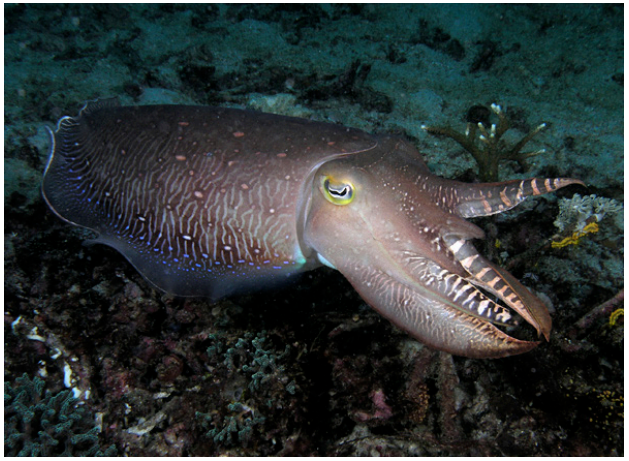
Recently I read an article that mentioned an Alfa Romeo Spider *aerodinamica*. Huh? What's an *aerodinamica*? Being at my computer I consulted Wikipedia's page for Spiders (en.wikipedia.org/wiki/Alfa_Romeo_Spider), which on close examination yielded some bits of information about Spider names and nicknames that was new to me. As you surely know there were four series of Spiders produced starting in 1966 and ending in 1993. The names for the first two series are well known, though perhaps not the meanings of those names. The names for the third and fourth series may be less well known.

Series 1 noses

A series 1 tail

Series 1: *Duetto*, roundtail, or *osso di seppia*. Although these names for the series 1 cars are used regularly, what exactly do the two Italian ones mean? *Duetto*, unsurprisingly, is the Italian word for duet and was the winning entry from the worldwide car naming contest held in the 1960s by Alfa Romeo. Perhaps the judges liked this simple, pleasant-sounding word for its symbolism of the car's similarly shaped nose and tail.

The Italian phrase *osso di seppia* means cuttlefish (*seppia*) bone (*osso*). That's fine, but I don't recall cuttlefish being available back in Chicago, nor here on the West coast. What is a cuttlefish? Per Wikipedia: it's a mollusc (or mollusk), not a fish, and is not found in the Americas, which explains why we North Americans are not familiar with them.



Seppia (cuttlefish)
Photo by Nick Hobgood/CC BY-SA 3.0

Osso di seppia (cuttlefish bone)
Photo by Mariko Goda/CC BY-SA 3.0

In my opinion, had the naming contest been held in the US, the winning name would have been "surfboard."

A series 2 tail

A series 3 tail (*left*) next to a series 2 (*right*)

A series 4

Series 2: *coda tronca* or Kamm tail. *Coda tronca* translates as truncated (*tronca*) tail (*coda*). Kamm tail comes from the name of the German aerodynamicist Wunibald Kamm, who in the 1930s demonstrated that cutting off a car's tail reduced drag.

Series 3: *aerodinamica* or duck tail. The Italian word *aerodinamica* is easily translated by English speakers as aerodynamic and refers to the rear spoiler added to the Kamm tail. (Some trim levels also included front spoilers.)

Series 4: *ultima* or *bella*. *Ultima* means last or finished, while *bella* means pretty. Spoilers were dropped in this series.

Spider photos by the author

American Pekin duck
Photo by Martin Backert/CC BY-SA 3.0

Cars of the *1000 Miglia* 2023

Bob Goldberg


1000 MIGLIA SHOP
35
DM-53-47


TYP 166


252986-TO


48
68
VN 3485


AR-90-70


184
159


PM-5216


293


554
201
FL-750-EX


399
ASTON
MARTIN


1000 MIGLIA
422


42
83
70


84
79 DY 75


145


66
66
294


58
ZB207-AS


103
103
W 88756 F


209
209


424
424
A-5793


57
57
CC 739 SC
4175 - PT


PORTA 6
CHOPARD
94
437


ALBO D'ORO - 1977 / 2022 ROLL OF HONOUR
MILLE MIGLIA 1927/1957


158
DZ-51-71


MILLE MIGLIA 1927/1957
AR-90-70
AR-95-35
100


145


544
157


192
TYP 168


94
LO0397-TO
42


138
8945 PS


342


347
347


318
318


149
38277


196
196
196


128
130
130
753


CHOPARD
259
259
259


34
GB 565


CHOPARD
Classic Racing
48


225
266


240


240


3


1000
IGLIA


241


106
CT A00001
BZ ENZO1

From the Museo Fratelli Cozzi Archives

Images provided by *Museo Fratelli Cozzi*

programma

alfa '70

1750 BERLINA
Una sportiva per la famiglia, silenziosissima e confortevole. La edizione 1970 è perfezionata con numerosi miglioramenti: doppio circuito frenante, sedili di nuovo disegno, fari allo jodio, ecc. 132 CV-SAE, 180 km/h, 5 posti.

1750 GT VELOCE
Un'Alfa velocissima, dalla sicurezza di marcia ancora migliorata grazie al doppio circuito frenante, agli appoggiatesta incorporati, al lunotto termico, ecc. 132 CV-SAE, 190 km/h, 4 posti.

1750 SPIDER VELOCE
Un'Alfa Romeo amica del sole e delle vacanze. Ora ha una linea più dinamica (coda tronca) e i miglioramenti apportati a tutta la gamma delle 1750. 132 CV-SAE, 190 km/h, 2 posti.

GIULIA 1300 BERLINA
Linea, struttura, motore e organi meccanici fondamentali identici a quelli delle Giulia di maggior potenza. 89 CV-SAE, oltre 155 km/h, 5 posti.

GIULIA 1300 TI
La macchina che dà maggior potenza a costi inferiori: pratica in città, ideale in autostrada. 94 CV-SAE, oltre 160 km/h, 5 posti.

GIULIA 1600 S
La Giulia dei grandi viaggi, con un prezzo d'acquisto ridotto. 109 CV-SAE, oltre 170 km/h, 5 posti.

GIULIA SUPER
La più completa delle Giulia: con una velocità, una ripresa e una praticità d'uso che sono altrettanti primati. Dotata di silenziosità e conforto insospettabili in una vettura di così alto temperamento sportivo. 116 CV-SAE, oltre 175 km/h, 5 posti.

GT 1300 JUNIOR
Lo stesso fortissimo temperamento della GT Veloce. Una cilindrata interessante per le spese fisse e di esercizio. 103 CV-SAE, oltre 170 km/h, 4 posti.

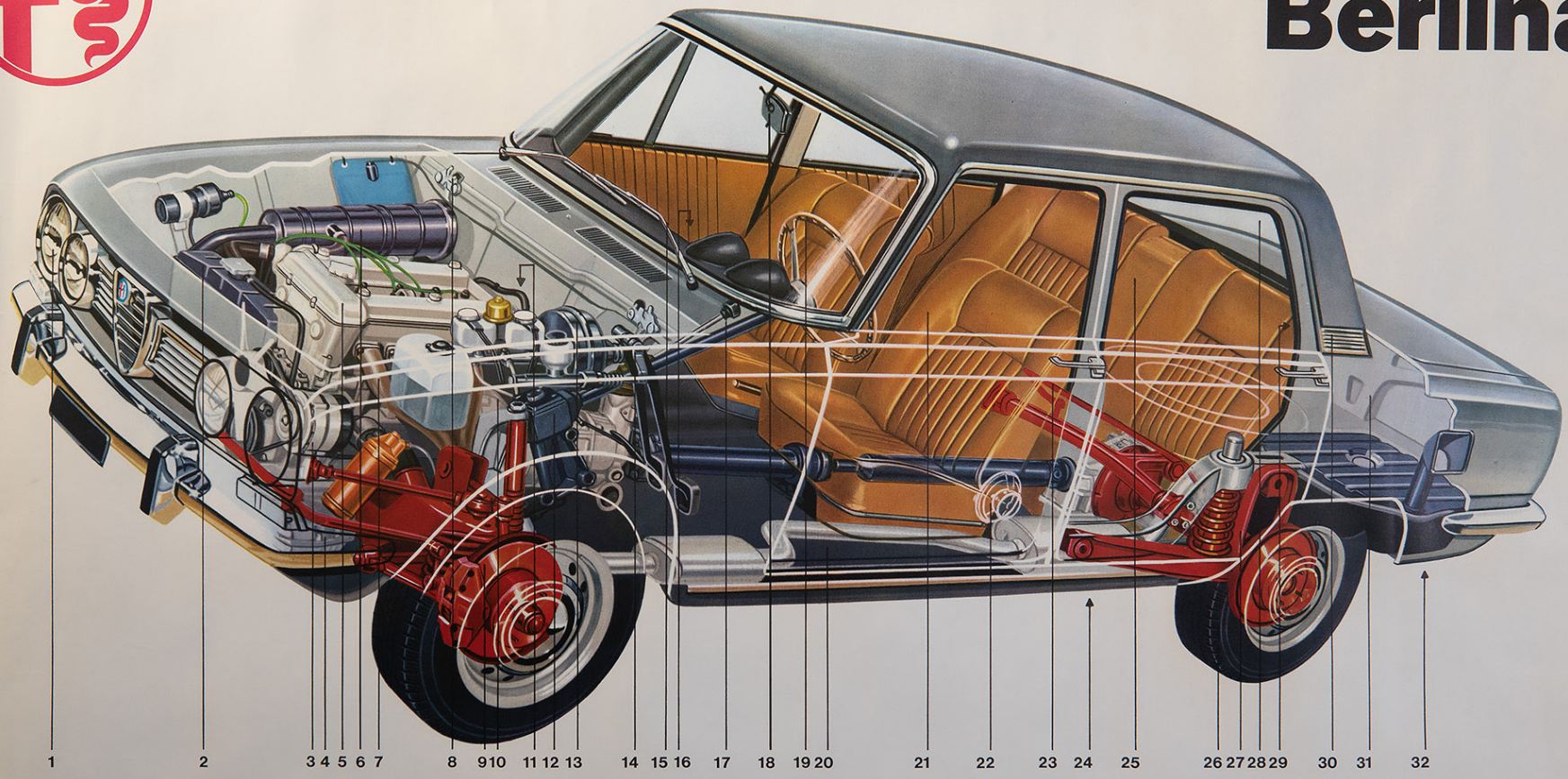
SPIDER 1300 JUNIOR
Una sportiva dalla guida entusiasmante. Nella nuova edizione la sua eleganza è più aggressiva grazie alla coda tronca. 103 CV-SAE, oltre 170 km/h, 2 posti.

GTA 1300 JUNIOR
Una carrozzeria alleggerita, un motore per prestazioni massime. 110 CV-SAE, 175 km/h. Elaborazione Autodelta: fino a 160 CV-SAE a 7800 giri e 210 km/h. 2 + 2 posti.

GT 1300 JUNIOR Z
La novità 1970: una macchina nuova non solo di linea, bensì anche per prestazioni, tenuta di strada e velocità. 103 CV-SAE, 175 km/h, 2 posti.

ALFA ROMEO

ALFA ROMEO 1750 Berlina



1 Fari doppi allo iodio di grande potenza, per una visibilità perfetta alle alte velocità, completi di correttore dell'inclinazione.

2 Circuito di raffreddamento con miscela anticongelante a livello visibile, per facilitare il controllo e per evitare l'apertura del radiatore a motore caldo.

3 Alternatore per consentire la ricarica della batteria anche a giri bassi (uso prolungato in città), migliorando le partenze a freddo.

4 Coppa dell'olio in lega leggera, ampiamente alettata e di grandi dimensioni.

5 Motore con basamento e testa in lega leggera, camere di scoppio emisferiche, doppio albero a camme in testa, valvole raffreddate al sodio, albero a 5 supporti.

6 Filtro aria di nuova concezione con presa dinamica per un miglior riempimento dei cilindri alle alte velocità.

7 Collettore di scarico con tubi separati, con disegno dei condotti calcolato per eliminare le risonanze.

8 Ganci per chiusura di sicurezza del coperchio cofano, incernierato anteriormente.

9 Freni a disco di grandi dimensioni con doppio circuito frenante. Superficie totale di frenata cmq 2560.

10 Frizione a comando idraulico con molla a diaframma.

11 Supporto cambio e attacco motore-cambio progettato in modo da eliminare la trasmissione del rumore nell'abitacolo.

12 Scatola sterzo in posizione arretrata di massima sicurezza per il guidatore.

13 Servofreno a depressione, collegato con ambedue i circuiti frenanti.

14 Pedali incernierati in alto, di comodo azionamento e facile « punta tacco ».

15 Tergicristallo a due velocità con bracci ad abbassamento totale.

16 Cruscotto in legno naturale, con vano radio predisposto, strumenti di immediata lettura e serie completa di spie.

17 Cambio a cinque marce con anelli di sincronizzazione al molibdeno.

18 Specchio retrovisore antiriflesso e sganciabile.

19 Volante a calice con comando avvisatore acustico nelle razze.

20 Strato di materiali assorbenti per un completo isolamento acustico e termico dell'abitacolo.

21 Sedili avvolgenti a struttura integrale per il massimo conforto in viaggio, tutti con predisposizione degli attacchi per le cinture di sicurezza.

22 Manopola per la regolazione continua dell'inclinazione schienale.

23 Barra stabilizzatrice posteriore.

24 Modulatore di frenata agente sulle ruote posteriori indipendentemente dal carico.

25 Doppio appoggiabraccia centrale ribaltabile.

26 Pneumatici a bassa pressione a larga sezione (165 SR 14).

27 Freno a mano di stazionamento e di soccorso con circuito proprio ed appositi tamburi separati sulle ruote posteriori.

28 Lunotto termico in vetro temperato.

29 Attacchi cinture di sicurezza anteriori e posteriori.

30 Bocche ricambio d'aria in uscita.

31 Baule « 11 valigie », ad assoluta tenuta di acqua e polvere.

32 Tubo di scappamento piegato per impedire il risucchio dei gas di scarico nella macchina e deviarli in uscita.

ARTI GRAFICHE RICORDI S.p.A. - MILANO - PRINTED IN ITALY

Type 115 Rear Suspension

Mark Thornton

This article begins with a quick survey of automotive suspension terminology and transitional handling, traditionally an area of excellence for Alfa Romeo. We continue with a look at the innovative type 115 rear suspension geometry, and then step through the components one by one.

We use the language of high-performance driving instruction, since that can simplify the discussion, and help us consider the elements of good handling in reference to Alfa's design and manufacturing technology. We will take a quick look at popular upgrades and improvements as we go along.

Transitional Handling

Type 115 Alfas are known for good transitional handling, the part of vehicle dynamics that is not cruising at a steady speed or carving a steady turn. Transitional handling is about change; from slow to fast, fast to slow, to the left, to the right, braking, accelerating, turning, taking crests, taking dips, crossing pavement changes, rolling through bumpy spots. It is not any one thing that makes the type 115 Alfa so much fun to drive. It's a package, well thought-out, well-manufactured, rugged, not overweight anywhere, and thoroughly tested. One looks and sees a kind of simplicity backed up by a com-

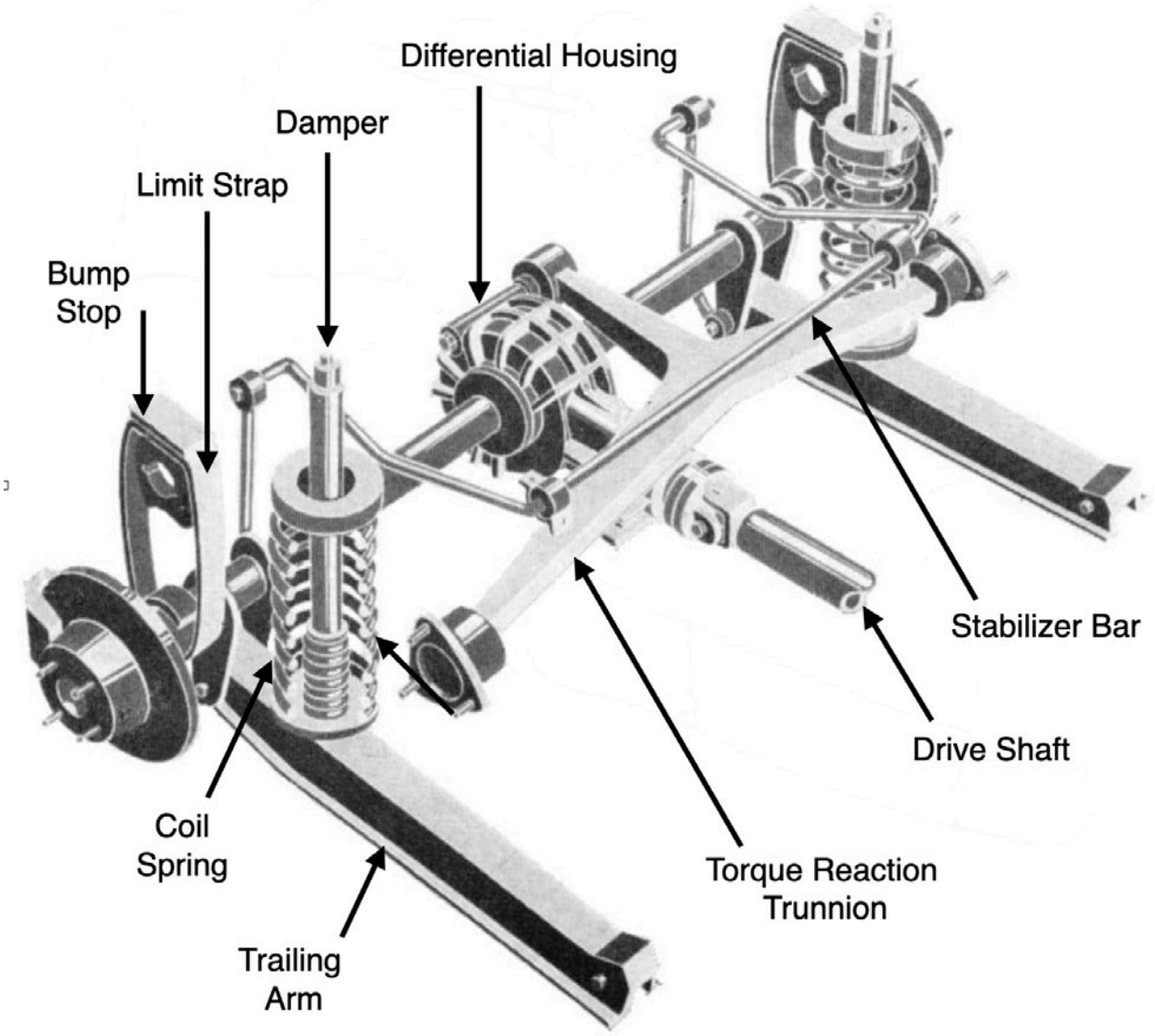


Fig. 1. Type 115 rear suspension

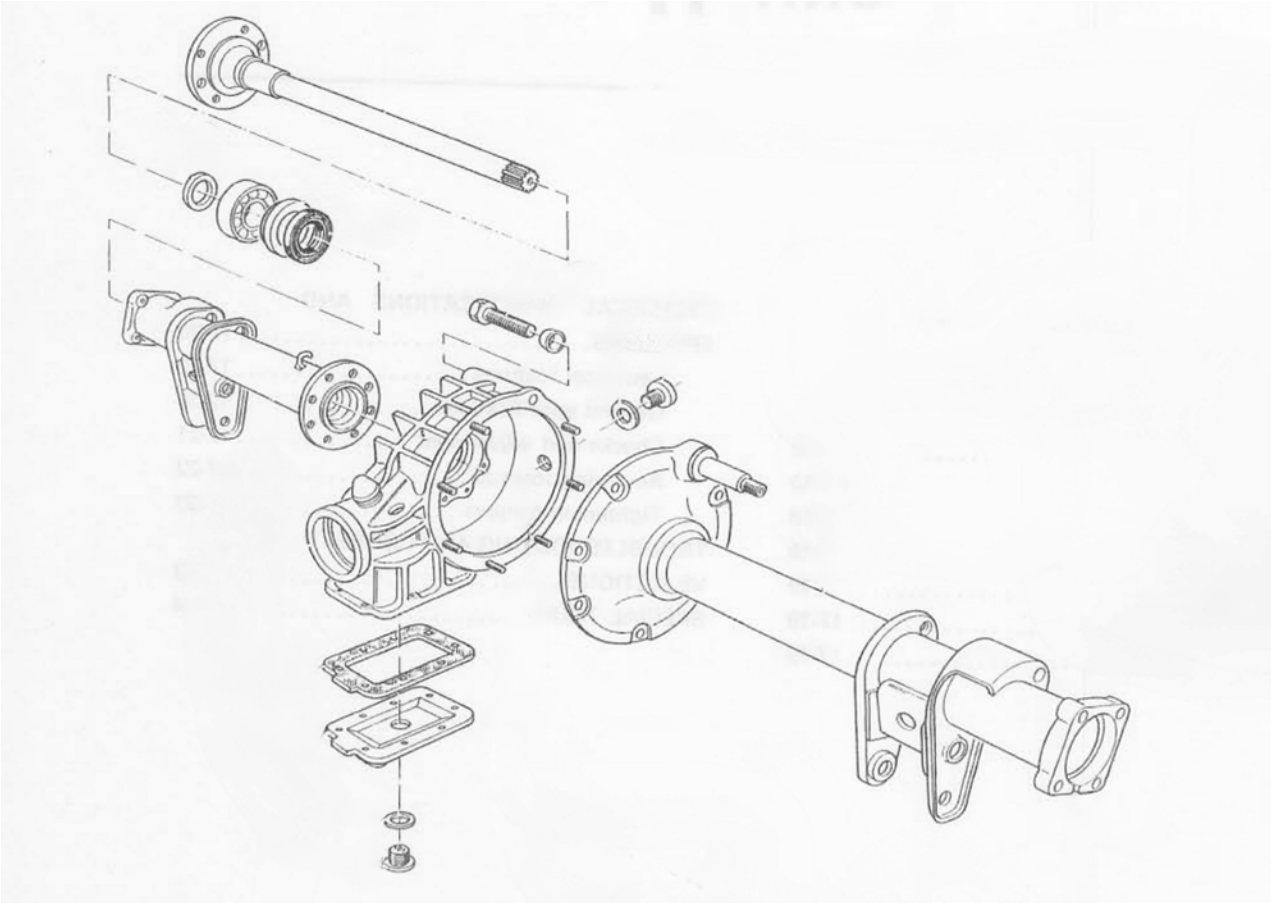


Fig. 2. Rear axle assembly

mitment to cut no corners. Alfa selected appropriate materials and manufacturing technology throughout.

What this thoroughness accomplishes is delivering us a car that handles well through upsets, giving the driver their best chance to utilize grip the tires develop, at no point getting very far out of shape.

Live Rear Axle

Alfa set the rear suspension up with what they called a live rear axle, shown in figure 1, a choice made in common with many contemporary cars. A friend, reviewing the article, pointed out that live rear axle, the phrase, was used to describe the setup on other cars too, not just Alfas. However, the way Alfa built the live rear axle and integrated it with the car sets its design apart. More about this later.

Before we describe the overall rear suspension geometry, we need to consider the live rear axle design configuration. The design aim is to allow the rear axle to react up and down when taking bumps, but otherwise to keep the wheels aligned precisely with the car, doing the best possible job maintaining a tire contact patch that can develop grip effectively.

Figure 2 shows a parts diagram of the rear axle assembly. Starting at the upper left in this view and continuing to lower right we first see the right-hand axle or half shaft.

Alfa upgraded the half shafts significantly for the type 115 cars, larger in diameter, carefully tapered in forged and hammered steel, and beautifully finished to manage stress risers.

Stress riser is a term engineers use to describe a feature on a stressed part, often a sharp machined edge that increases the likelihood of failure. The half shafts serve as a good example. Another of the family sports cars broke a half shaft, the splined inner end fracturing at the point where it fit the sharp edge of the differential carrier. On the Alfa we instead see careful treatment of the drive splines, with a smoothly radiused transition to the non-splined section of the axle, taking away the added stress created by the sharp edge on the other car.

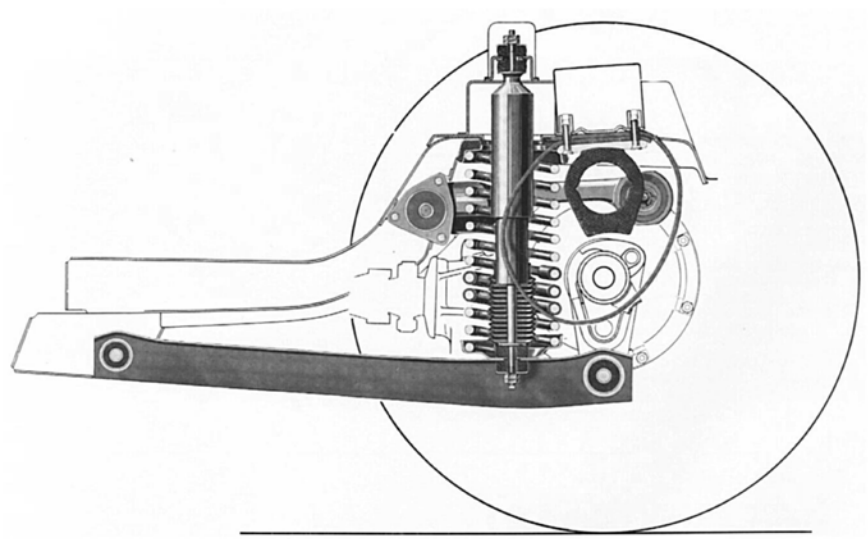


Fig. 3. Rear suspension (side view)

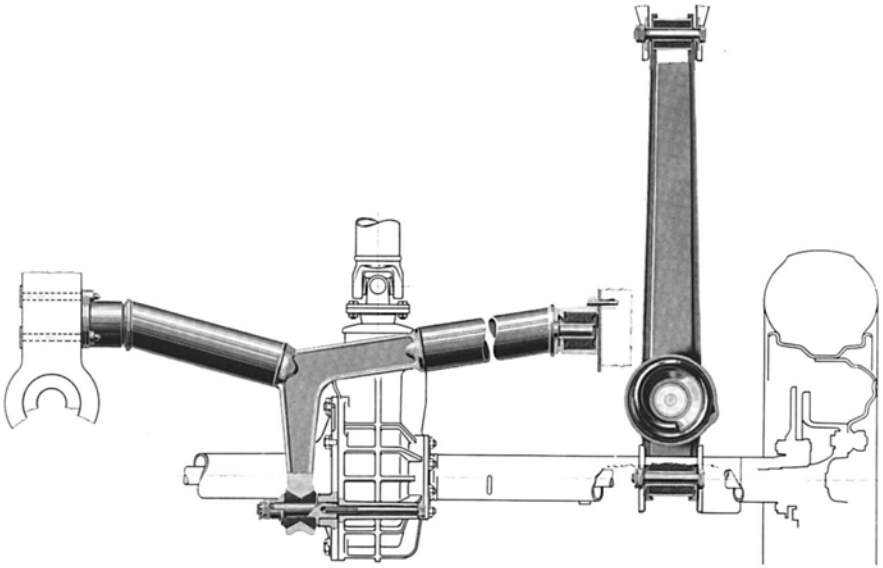


Fig. 4. Rear suspension (top view)

Continuing with the half shaft, we see the collar and the wheel bearing and the right-hand axle tube. The welded steel axle tube assembly incorporates the shackles that carry the weight of the car and fit the rear end of the trailing arm.

Midway along we see the cast alloy differential housing with extensive cast ribs providing structural ruggedness and helping with heat transfer, cooling the differential lubricant. We see the drain and fill plugs, fabricated in brass. The compact rectangular sump is fabricated in cast alloy.

Continuing to the left side axle tube we see the full diameter welded steel cover and the left side shackle. This cover supports the heavy steel stud that fixes the center boss of the torque reaction trunnion to the top of the differential assembly.

Rear Suspension Geometry

The perspective drawing in figure 1 gives us a good overview of the type 115 rear suspension without getting bogged down in too much information.

The artful illustration in figure 3 shows a lot of parts in side view, enough to look complicated. To sort this out we will work with a series of perspective views each showing fewer parts. We get to choose our focus when we see a view like this one. I think this view helps us see the function performed by each of the suspension components.

For example, we can think of the live rear axle as primary structure. A stabilizer bar helps manage body roll when cornering. Each coil spring carries the load from the weight of the corresponding corner into the axle by way of the trailing arms. Two trailing arms locate the axle relative to the chassis, helping keep the wheels pointed where they should. The trailing arms also transmit acceleration and deceleration force to the chassis and tend to limit squat because of the upward angle toward the forward end. The torque reaction trunnion, here seen above the differential and rear axle, limits the amount by which the differential and rear axle assembly will rotate under load, protecting the drive shaft from excessive

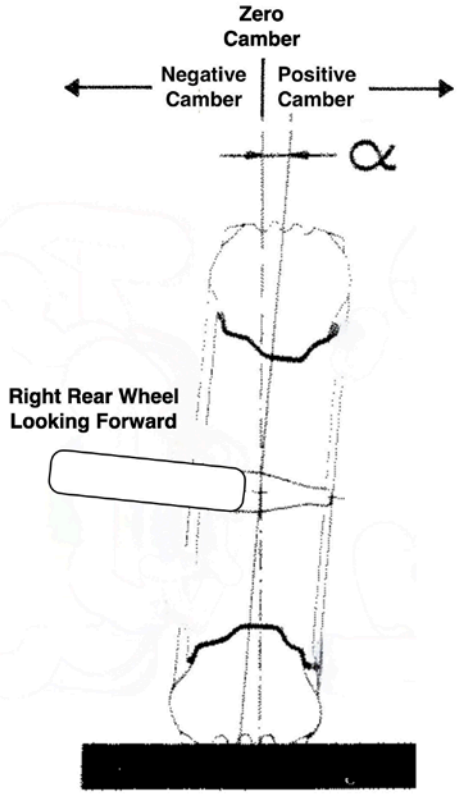


Fig. 5. Wheel camber angle (rear view)

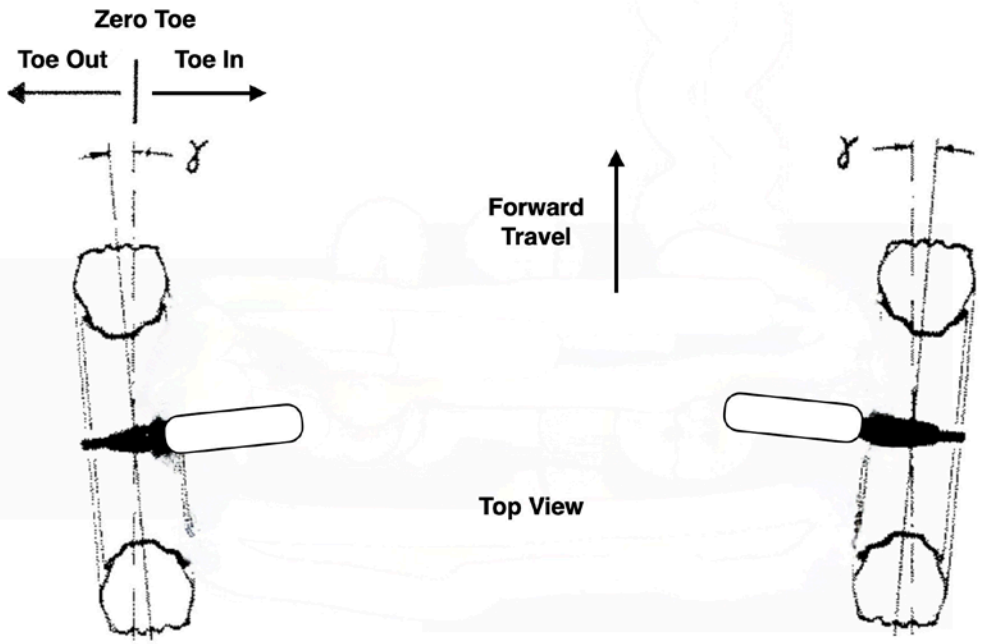


Fig. 6. Wheel toe out (top view)

running angles. The torque reaction trunnion takes effect both for acceleration and for deceleration. The elastomer bump stop handles excessive loads in compression, protecting the structure from spring binding load, and also protects the shock absorber from excessive load at full compression. The limit strap holds the rear axle in place over crests, when the car might take air, and prevents excessive loads from being taken up in the shock absorber at full extension. The telescopic hydraulic damper helps damp oscillation of the combined system, car, spring, and suspension. That's a lot to think about for one paragraph. We are going to break this down into smaller chunks in the paragraphs ahead.

Figure 4 is an illustration that reminds me that any one Alfa likely will differ from what's shown in an illustration. My own Alfa, for example, has a cast steel torque reaction trunnion, the large T-shaped component near center, and does not have the tubular structure we see in figure 4. Instead, the cast steel torque reactor trunnion looks like what we see in figure 10, with an I-beam cross section, a few pages farther along. For our purposes this variation does not fall in the problem category. The meaning is the same, showing how the torque reaction trunnion carries load from the cast alloy differential housing to the chassis, stabilizing the differential and rear axle assembly.

When we look at this assembly there's a tendency, natural I think, to focus on the force applied to the differential assembly

during acceleration. That's all very well. It's true that the torque reactor trunnion handles that load and prevents the car from squatting under acceleration, an undesirable characteristic. Squat is a term used to describe the car lowering at the rear suspension.

I like to turn this around and instead look at how the torque reaction trunnion works under braking. The Alfa can brake at over 1 g, generally putting much higher loads on the suspension than during acceleration. Braking load is shared between front and rear, weighted toward the front, while acceleration is applied only at the rear axle. Arguably the torque reaction trunnion helps the car resist dive under braking, another undesirable handling characteristic. Dive is a term used to describe the car rising at the rear suspension and lowering at the front suspension.

Discussing the rear suspension geometry is a good time to spell out wheel alignment parameters including camber and toe. Camber is the angle of the plane of the wheel with reference to the car vertical axis. Zero camber is the desired value for the type 115 Alfa rear wheels. Figure 5 illustrates camber angle at the right rear wheel, looking forward.

Many tuners set more recent cars to negative camber at the rear wheels. A friend, reviewing the article, asked why does this work. Doing so can help the tire generate grip, in part because of how negative camber helps prevent the tire from rolling under.

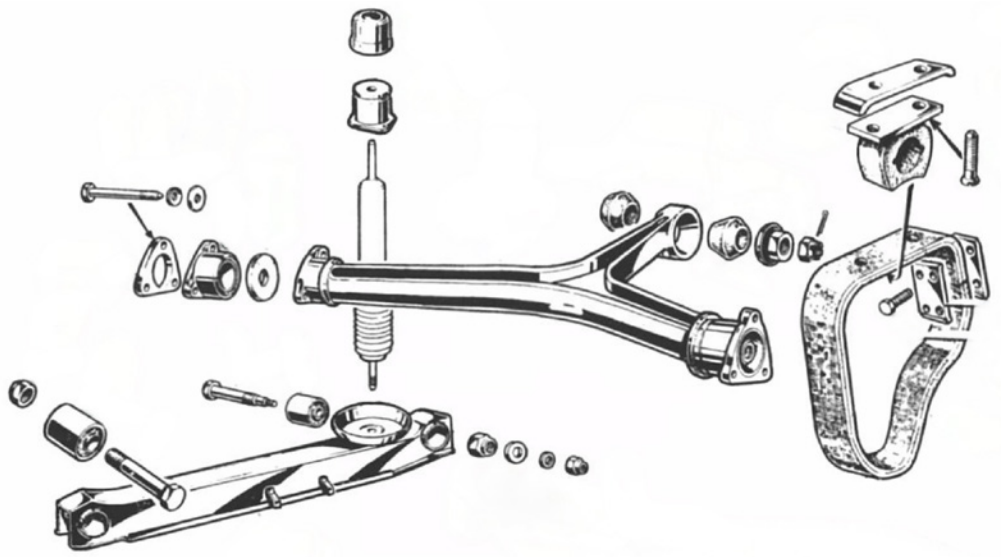


Fig. 7. Rear suspension overall parts diagram

Motorsports drivers sorting out their cars highlight wear markers on the tire using white shoe polish. Manufacturers mold wear markers, often a small triangle symbol, to indicate the far extent down the sidewall where they think it's appropriate for the tire to roll on the pavement, when generating cornering force. The shoe polish dots, about an inch across, make it easy to see how far down the sidewall the tire is scrubbing on the pavement. Motorsports drivers learn to pay attention because wear this far down on the sidewall generally leads to extreme wear at the edge of the tire tread, sometimes going so far as to expose tire cord. Exposing the tire cord means buying new tires. This is called cording the tires.

Opposite to negative camber, many cars generate undesirable positive camber because of exaggerated body roll or loose suspension parts, tending to reduce grip, particularly on the outside wheel. This also predisposes the tire to roll under. As noted, that tends to go badly. Contrary to this, elegantly simple as it may be, the Alfa's live axle setup by and large does OK at maintaining zero camber.

How far can it go, the tire rolling under? Technicians thought it likely, when the cars were new, that the low recommended tire pressures could allow a tubeless tire to roll over far enough to unseat the bead of the tire, deflating the tire while driving. The

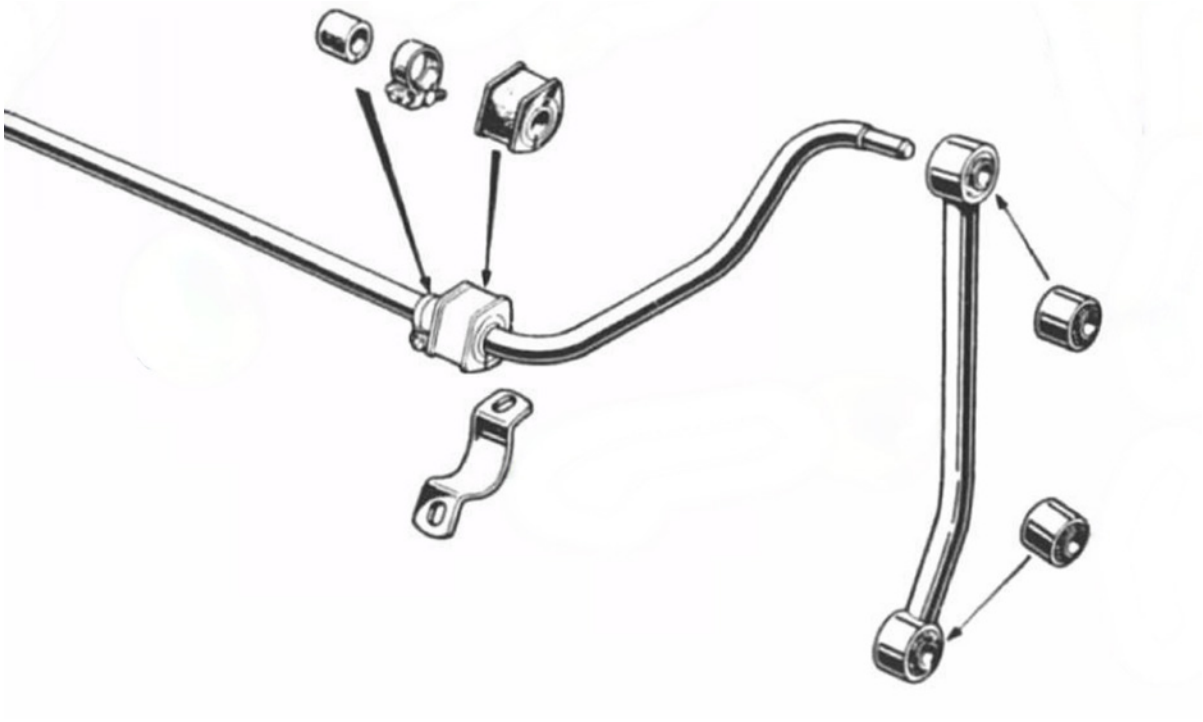


Fig. 8. Stabilizer bar / bushing / end link

story went that this was among the reasons the OEM tires were fit with inner tubes, by no means common in the early 1970s.

Toe is the angle of the plane of the wheel with respect to the car longitudinal axis, illustrated in figure 6. Many cars are set to toe in on the front wheels and toe out on the rear wheels. Toe out means that the rear wheels run slightly farther apart on the forward side. The aim with the Alfa's live rear axle is to hold steady zero toe on the rear wheels.

Automakers were making a change to independent rear suspension during the time that Alfa sold the type 115 cars with the live rear axle. There are advantages to independent rear suspension, including reduced unsprung weight. Structural drawbacks and complexity tend to balance out that advantage. Picture what it takes to maintain appropriate camber and toe with the independent design. All too often independent rear suspension becomes too independent, that is not aligned precisely, when subject to heavy load in cornering.

Over the decades since the type 115 cars were built the automotive industry, including Alfa Romeo, has gone largely, but not entirely, in the direction of independent rear suspension, reckoning the value returned acceptable in view of cost.

Any way I look at it the type 115 rear axle assembly is a big plus for the Alfa, helping it launch well out of corners, one of its best transitional handling characteristics.

Rear Suspension Components

The type 115 Alfa rear suspension incorporates several components that serve a fundamental purpose in the design, yet may not be familiar to those who know other cars. I think of this in terms of the elements of the design, and how each component of the rear suspension helps provide performance we need, while limiting undesirable characteristics we don't need. We can picture a component in the type 115 Alfa rear suspension that reacts each type of load effectively, typically not expecting any one component to react more than one type of load.

The delightful diagram in figure 7 does a great job depicting the parts of the rear suspension, taking artistic license here and there with the scale size relationships of the parts. Since this view necessarily shows so many parts, we will proceed to look at sections of the illustration, taking the major component assemblies one by one, starting at lower left and proceeding clockwise to upper right.

Live Rear Axle. There is much to say in favor of the live rear axle. This means

that there is a solid structure joining the differential, both left and right half shafts, and the housings that fit the brake calipers, bearings, and hubs. Drawbacks include the entire rear axle assembly reckoning into unsprung weight. Advantages include maintaining fixed camber and toe.

Engineers use the term unsprung weight to denote parts of the car that move with the tires and wheels, accommodating to road surfaces. We can think of unsprung weight as the weight of parts of the car on the pavement side of the springs, not on the chassis. All other factors being the same, less unsprung weight can help the car with transitional handling, accommodating to road surfaces more readily, less affected by inertia.

Stabilizer Bar. Type 115 Alfas were fitted at the factory with a relatively soft rear stabilizer bar, captured at two points on the unibody chassis via rubber bushings. The stabilizer bar ends have a link bar with rubber bushings in each end, one attached to the sway bar, and the other attached to the rear bolts securing the trailing arms.

A friend reviewing the article asked about this terminology. It's a good question. Engineers use the term unibody to refer to an integrated chassis generally fabricated in pressed steel to form a monocoque structure, meaning all one piece. Earlier cars differed in having a separate frame. Unibody primary structure was thoroughly conventional when the Alfa was built. More recent models may incorporate various kinds of subframe or reinforcement. For an example, we can look at the rugged cast alloy front shock towers on the late model Alfa Giulia and aluminum reinforcement of Alfa's iconic carbon-fiber 4C.

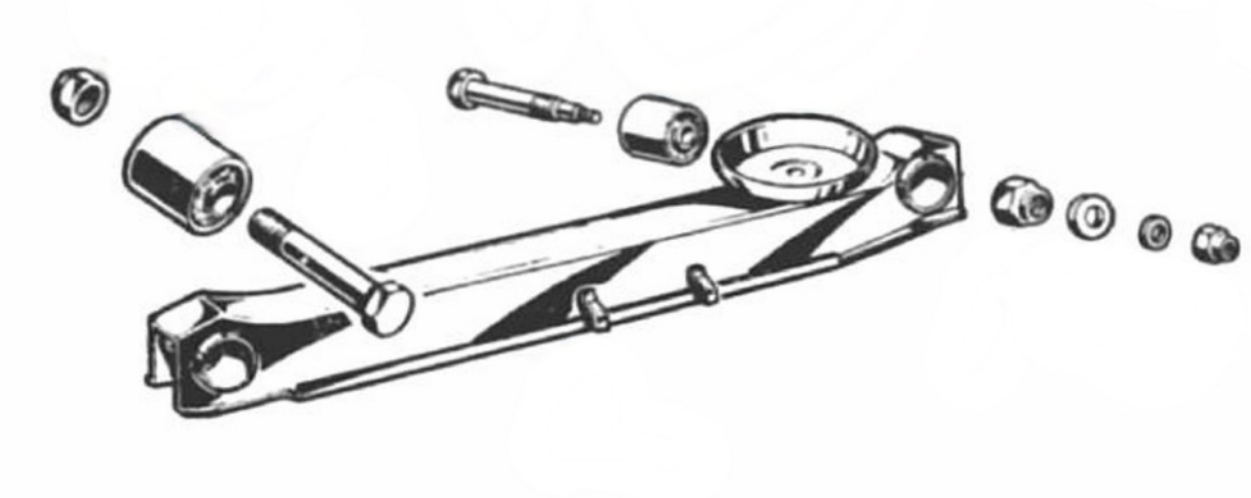


Fig. 9. Trailing arm / bushings / bolts

In figure 8 we see the left side of the stabilizer bar assembly. The rear stabilizer bar is notably lighter in weight than the front stabilizer bar.

Some type 115 Alfas have had the rear stabilizer bar removed, in favor of a stouter front stabilizer bar. With some sports cars, motorsports enthusiasts experience picking up the inside rear wheel, clear off the pavement, a condition that is normal enough but that doesn't help very much with cornering. On one of these rigs adding a stouter rear stabilizer bar serves mainly to pull the inside rear wheel farther off the pavement. The type 115 Alfa, to the contrary, famously tends to pick up the inside front wheel, launching out of corners at the limit. A reviewer suggested that I re-write this paragraph to emphasize that picking up a wheel, whether rear or front, is a vice not a virtue.

Trailing Arm. Alfa set up type 115 cars with trailing arms that serve to locate the live rear axle, helping the car to handle better under acceleration. The trailing arms, with bushings in good condition, help the car launch out of turns without self-steering.

Tuners use the term self-steering to describe any tendency the car has to dodge to one side or the other while the steering wheel remains steady. Self-steering falls into the vice category.

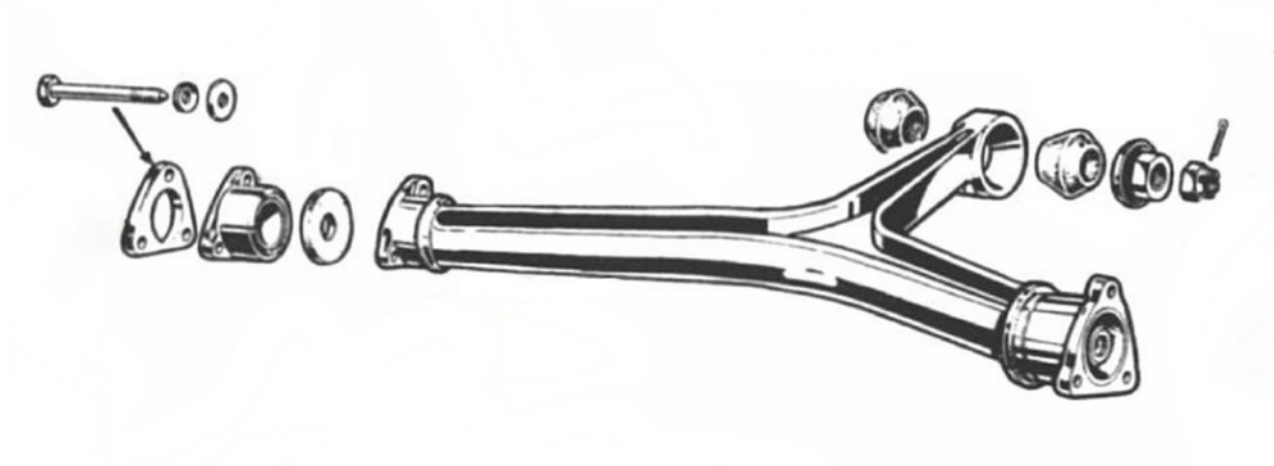


Fig. 10. Torque reaction trunnion / bushings / bolts

In figure 9 we see one of the two pressed-steel trailing arms, its bushings, and the bolts that fix it to the chassis, forward, left in this view, and to the rear axle assembly, rearward, right in this view. These robust bolts were fabricated in heat treated alloy steel by LOBO. Their generous proportions help us to see their importance in the eyes of the designers.

Among the reasons for this, the lower spring rest is integrated with the trailing arm. The load path for the weight of the car passes through the coil spring into the spring rest, the trailing arm, and then by way of the bushing into the shackle welded to the rear axle. That's an interesting design approach, one that I am not accustomed to see other than on these cars, a design approach that works in more than one way.

The trailing arm geometry also allows the live rear axle to apply heavy acceleration force to the chassis without causing the rear of the car to settle, or to squat, an undesirable performance characteristic of many contemporary cars.

Torque Reaction Trunnion. This is a rear suspension component that may not look familiar. I first encountered it with my type 115 Alfa and thought it brilliant. This rugged cast steel assembly is shown in figure 10, reacts torque produced by the tires. On many cars the differential and rear axle assemblies tend to rotate under torque during acceleration and braking, leaf springs on those cars serving imperfectly to accept that load. Alfa's torque reactor, fit with rubber bushings at each side and at the center, accepts the torque load and holds the live rear axle assembly to a limited extent of rotation.

Figure 10 shows the torque reaction trunnion, its attach points to the chassis, and the elastomer bushings that locate and stabilize the top of the cast-alloy differential housing. The drawing does a good job of portraying the stout construction in cast steel. Perhaps I could better say STOUT. This thing is heavy and strong.

This rear suspension component, usually out of sight, contributes in a big way to how well these cars perform in transitional handling. Among other things, this design helps protect the drive shaft from abrupt changes in running angle. That sort of change would otherwise notably increase noise, vibration, and harshness from the drive shaft while launching out of corners. Instead, the type 115 Alfa launches out of corners at full power with the most remarkable poise. That's not ordinary. That's an achievement.

Bump Stop. The bump stops fitted to the type 115 rear suspension are artful in manufacturing and elegant in form. (Figure 11) So simple! But why are they on the car?

Two facts, both sort of unfortunate, emerge from studying the design. The springs can only compress so far before the coils begin to touch. At that point the spring has roughly the properties of a steel pipe. So, the load, in response, grows very high. High enough to squash the tire, and to take away from performance, which is bad. High enough to bend the shackles on the rear axle tubes, which is worse.

Look again at the load path for the Alfa's weight, passing via the axle tubes, through the shackles, into the trailing arm bushing, via the trailing arm to the spring rest, and via the spring to the upper spring rest in the unibody chassis.

Look for welded reinforcement on the shackles, a drastic repair that is not all that rare. The bump stops serve an important purpose.

Many automakers choose to take up bump stop loads in the hydraulic dampers, bringing suspension travel to a remarkably abrupt stop when the dampers bottom out.

Interesting to relate, for the Berlina there were heavy duty bump stops you could buy at the dealer parts counter. I broke a bump stop, bent the shackle, and paid for the welded repair.

I broke the bump stop on a logging road, running at speed on gravel and dirt. The Berlina was almost perfectly suited to that sort of driving, with its long suspension travel, gentle spring rates, and ample ground clearance, ample compared to sports cars, that is.

The ever-helpful parts counter man suggested that I purchase the heavy-duty bump stops. Naturally, I assumed that the heavy-duty bump stops were a tuner item built for go-fast. I was wrong. The heavy-duty bump stops were for trailer towing.

Limit Strap. I have heard people disparage these parts, opining that they look like something from the 1930s. Coachwork and suspension components do not need to be new designs to be good. So, how did these fabric straps find their way onto type 115 Alfas?

The answer is simple, provided that we look at it through the eyes of a car builder, who understood the three important things to remember about the limit straps and how they work.

First, what happens when the car takes air? Consider what happens over a crest on a racetrack when the rear wheels are briefly unweighted. Lapping at The Ridge Motorsports Park, taking the crest after we exit the carousel gives us an example. The engine races! The springs on type 115 Alfas are not bolted in, so what keeps a spring from falling out of the spring rests? The limit strap. The limit strap likewise keeps the spring inside the spring rest in heavy cornering, when weight transfer tends to lift the inside wheel.

Second, Alfa rejects a concept common to many car designs. Lots of cars use the hydraulic damper to limit suspension travel. That puts wear on the damper mechanism and likewise tends to pound out the elastomer bushings fitted at top and bottom of the damper.

Third, the limit straps have to accept a high load at times. This results not from the force of the springs—remember that we've noted that the springs could fall out—rather it's because inertial forces as the car moves away from the rear axle can run high.

Fig. 11. Bump stop / limit strap / bolt plates / bolts

Coil Springs. Popular aftermarket springs and telescopic hydraulic dampers are often fitted at the same time, replacing the factory stock units. These springs are shorter than stock and feature a drastically higher spring rate. The effect on the car is to lower the suspension and to make the ride much firmer.

Please see figure 12. The type 115 Alfa rear coil springs feature a rubber snubber or cushion at the top to cushion the load on the chassis, a way to manage noise, vibration, and harshness. Different spring caps

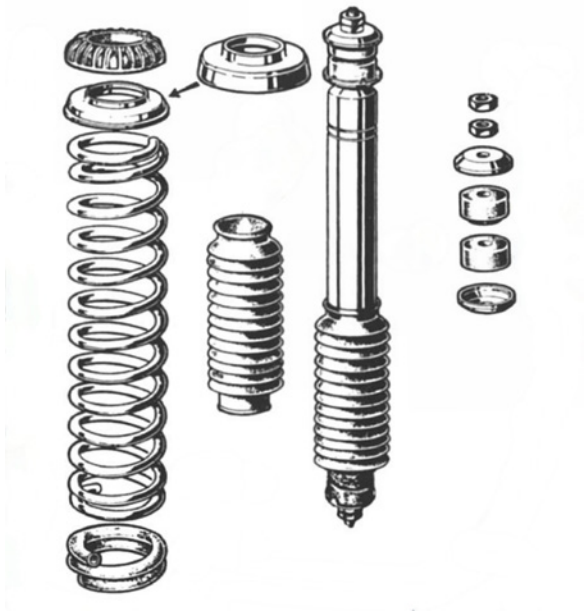


Fig. 12. Coil spring / spring rest / shock absorber / elastomer bushings

and spacers serve to allow adjustment of ride height and corner weight.

These coil springs may appear remarkably tall to people more familiar with newer cars. In the 1970s the design approach included what was then called long suspension travel, considered a plus for handling and durability for cars driven on bumpy city streets. I have seen photos from the magnificent test facility at Balocco showing these cars running over rough cobbles.

The designers knew what owners were going to do with these cars, so they built for that. I remember appreciating long suspension travel, driving unpaved mountain roads at speed. I have run an Alfa set up that way on track for a lot of laps. The local track had rough spots then, big time. A while later I recognized that long suspension travel was not the setup for fast lap times. Simple enough. My Alfa is on different springs today. I do however retain an appreciation for what the engineers at Alfa built into the car from the factory, well-suited to the tires we could buy when the cars were new.

Telescopic Hydraulic Dampers. Popular aftermarket telescopic hydraulic dampers fit the same physical envelope but may differ substantially from the stock dampers from SPICA. The SPICA dampers are an interesting gas-pressurized design. These feature notably higher damping resistance in rebound than in compression, unlike dampers used on many other cars.

Conclusion

I can recommend working with a good suspension tuner to learn more about how the rear suspension operates, to identify needed maintenance or repairs, and to select wisely when making improvements. *CAMS*

Further Reading

Several good suspension tuning books present valuable material in this subject area. I can recommend Carroll Smith's venerable book *"Tune to Win: The art and science of race car development and tuning."* ISBN 978-0879380717

In *"How to Make Your Car Handle"* by Fred Puhn we get a sense for the state of tuner suspension modifications in the 1970s and 1980s when type 115 cars were still new. ISBN 978-0912656465

While the differences between other cars and our type 115 Alfas may be large in scope, studying the tuner's modification principles can prove illuminating. I find these books help me understand just how well the Alfa performs in transitional handling.

Attribution

Illustrations presented are adapted from an Alfa Romeo Owner's Manual from 1974 and a shop manual from the 1980s.

F1 Review: Races 22–23

Jon Gavin

The long 2023 season is in the history books with the completion of the last two races, Las Vegas and Abu Dhabi. We'll dive in after some news.

News

The Andretti-Cadillac team entry saga took another step. Andretti significantly upped the ante by presenting a firm commitment from GM to design a new powertrain for the car. Till now, the entry was based on a Renault customer powertrain deal with very little in the way of solid technical engagement from GM. F1 had used this as another reason to resist the entry, but this is a significant move from Andretti to negate such excuses. How will F1 react to this move? Bring on the popcorn!

McLaren announced a new powertrain deal with Mercedes High Performance Powertrain that will ensure engine supply thru 2030.

Lawrence Stroll divested an undisclosed portion of the Aston Martin F1 Team holding company with a sale of equity to Arctos Partners, a Private Equity group focused on sports properties. The sale values the team at about $1.2 billion.

On the Tuesday following the final race a day of testing was available. Teams could run two cars, one with a rookie or reserve driver, the other set up for tyre

Race Results & Championship Standings - 2023 Final

Team	Team Points	Driver	Las Vegas Result	Abu Dhabi Result	Driver Points
Red Bull	860	Max Verstappen (VER)	1	1	575
		Sergio Pérez (PER)	3	4	285
Mercedes	409	Lewis Hamilton (HAM)	7	9	234
		George Russell (RUS)	8	3	175
Ferrari	406	Charles Leclerc (LEC)	2	2	206
		Carlos Sainz Jr (SAI)	6	18	200
McLaren	302	Lando Norris (NOR)	DNF	5	205
		Oscar Piastri (PIA)	10	6	97
Aston Martin	280	Fernando Alonso (ALO)	9	7	206
		Lance Stroll (STR)	5	10	74
Alpine	120	Pierre Gasly (GAS)	11	13	62
		Esteban Ocon (OCO)	4	12	58
Williams	28	Alexander Albon (ALB)	12	14	27
		Logan Sargeant (SAR)	16	16	1
Alpha Tauri	25	Yuki Tsunoda (TSU)	DNF	8	17
		Daniel Ricciardo (RIC)	14	11	6
		Liam Lawson (LAW)	—	—	2
		Nyck De Vries (DEV)	—	—	0
Alfa Romeo	16	Valtteri Bottas (BOT)	17	19	10
		Zhou Guanyu (ZHO)	15	17	6
Haas	12	Nico Hülkenberg (HUL)	DNF	15	9
		Kevin Magnussen (MAG)	13	20	3

Fastest Lap Point (if in top 10)

DNS/F:Did Not Start/Finish

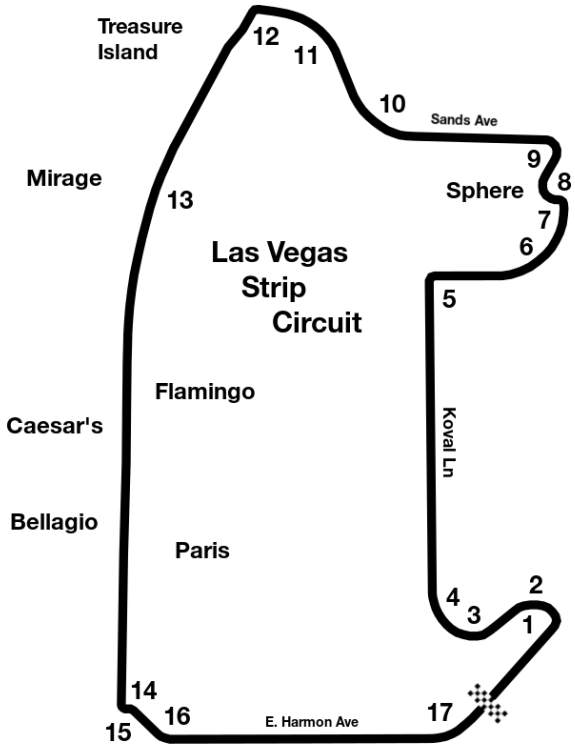
testing with a regular driver. Some had one driver in each car covering the day, others split the workload. Some all-day drivers covered over a hundred laps. Ocon topped the timings for Alpine. Russell crashed his Mercedes. Theo Pourchaire and Zhou Guanyu drove for Alfa.

The final piece dropped into the driver jigsaw puzzle as Logan Sargeant was re-signed at Williams. Due to his poor performance doubts on his tenure were rife. However, the team did seem to want to give him a chance to improve. This means that the complete ending of 2023 lineup will continue unchanged into 2024. Many driver contracts expire at the end of 2024 so look forward to a healthy silly season next year.

Race 22: Las Vegas, USA

The Las Vegas Grand Prix marks a return of F1 to the city, but under very different circumstances. F1 last raced in Vegas in 1981 and 1982. A temporary track was set up in the car park of Caesar's Palace, a rather unedifying arrangement rather like a big autocross under a blazing sun.

For 2023, the race returned to a new circuit laid out mainly on the Vegas streets, including the Strip as the main straight. Event timing was a little odd with the race start at 10pm on Saturday. This was a workaround for the general running of the town and a nod to European watchers who could watch the race live albeit with an early start. As with all desert circuits, Vegas looks much better by night.



The lap starts off on a permanent purpose-built pit/stadium area. The first couple of turns are on the permanent lot, then the track exits out on to a straight formed by Koval Lane. Then a sharp right turn on to a tour round the Sphere, which was used to great effect over the weekend displaying all sorts of race related graphics. After that, out on to Sands Ave and down to a sharp left onto the Strip. From there it is a full throttle charge down to the last real turn, a wiggly left onto E. Harmon Avenue and back to the pit and start/finish area.

The layout has only two real features: fast full throttle sections joined up by tight corners. There are no tricky technical medium radius fast turns, and barely even a chicane. Thus, the recipe was low downforce, push as fast as possible, and see if you can overtake under braking into one of the turns. Aside from some areas for overshoot at the tight turns, there was no runoff area. Concrete barriers clearly defined the track edge.

The surface was brand new and quite slick. There were no support races to add rubber over the weekend and public use of the roads between sessions could also leave oil and dirt on the surface. Vegas at night in November was also cold with temps in the teens.

In an unprecedented arrangement, F1 took on the running of the event as the promoter and the builder of the permanent facilities. The deals with the city are for a ten-year run. For Vegas, it adds to their re-branding as a sports destination; the Superbowl is coming to town in a few months' time.

Lap length is a long 6.2 km resulting in fifty race laps.

Weekend Overview: Las Vegas

Many of the teams took the opportunity to display special liveries. Alfa had a cool playing card patchwork effect making for a mainly black car, Williams had a big Las

Vegas sign on their rear haunches, Red Bull also took on some Vegas themes. Ferrari had red with white trimmings to celebrate their North American racing activities.

Mercedes provided the usual pace car, but following it round at times was an Alfa Giulia also resplendent in red. A silver/grey Giulia was also spotted in the pit lane.

After much hype and hoopla in the build-up, Free Practice one (FP1) kicked off and most of the cars came out promptly and quickly spread themselves around the circuit to get the first real world data points on this new track. Tyre of choice was either the medium or soft tyre with only Alfa choosing a hard tyre.

Track was cool at 19C and was of course dusty and green. Times were duly logged.

About seven minutes in, a Yellow Flag appeared along the main straight but there was no obvious reason with no crashes or breakdowns. Less than a minute later Sainz was coming through the same section when his Ferrari jumped having hit a bump. He immediately stopped at the side of the track. It wasn't clear at first what had happened but there was a trail of oil on the track. Thoughts went immediately to a powertrain failure which was quite a plausible explanation at this late stage of the season.

Subsequent analysis revealed a drain cover had been pulled out of the track by under-car suction. This is not unprecedented, especially on street tracks, and measures taken include locking and welding manhole covers. However, in this case it was not the cover, rather the complete assembly, cover and frame, that had become disconnected from the structure below ground. It then lifted damaging both the chassis and destroy the powertrain. Zhou following behind Sainz in his Alfa hit some debris and suffered damage too. Ocon who was coasting down under the red flag in his Alpine also suffered chassis damage as he passed the stricken Sainz.

Both Ferrari and Alpine would have to build up new cars around new chassis. Ferrari would also have to replace all the powertrain components for Sainz. For Sainz it would lead to penalties as the new components would be beyond his season's allowances.

Once the root cause was identified, about ten minutes later, the session was cancelled as a restart would not be possible without repairs and additional infrastructure inspections.

For the record, Leclerc was fastest in his Ferrari, Hülkenberg and Magnussen of Haas were second and third. Verstappen was fourth for Red Bull.

The 12am start of FP2 was delayed until 2:30am as the FIA and track folks inspected all the remaining covers and attended to repairs. The session was extended to ninety minutes, the maximum that could be taken before the roads needed to be reopened for public use.

Fans, who had already missed a lot of action in FP1, were not allowed to remain in their seats for FP2, as there were no staff available to support them due to the delayed session. The fan experience was not looking so great. Media handling also left something to be desired.

On track, the cars were all out on either mediums or softs on a cooler 15C track. Essentially, the teams used the extra thirty minutes to run a second qualifying simulation. So, we had an initial phase on mixed tyres as the track was cleaned and drivers got their eye in with a lot of lock ups and overshoots consequently. Then, two phases of qualifying practice and finishing up with high fuel race simulations. The track condition significantly improved throughout the session, so the top times were continually updating.

Ocon and Sainz were able to get out in their rebuilt cars. Both McLarens were out early, but quickly returned to the pits. Norris' car had a cooling problem, and he would be in and out of the pits several times in the first half.

Final placings were Leclerc fastest ahead of Sainz and Alonso third in the Aston. Verstappen was only sixth, Norris, who struggled all session, was down in eleventh.

With a successful FP2 in the bag, things began to look up for the weekend. FP3 would be next with the first of two sessions on Friday. Once again, the session was post sundown and the track was at a cool 19C.

There was no real rush to the track. Once they got started there was a mixture of run plans in play. The track never fully filled until the last ten minutes as most cars hit the track on the soft tyre for a final qualifying prep.

At five minutes to go Albon clipped the wall exiting T5. As he limped round his Williams' rear tyre tread detached and rolled down the main straight. A Red Flag was thrown scuppering any chance for a final fast lap prior to qualifying. Final rankings were Russell first for Mercedes ahead of Piastri in the McLaren and Sargeant's Williams. Verstappen was fourth just ahead of his teammate, Pérez. The Ferraris were down in sixteenth and seventeenth having not used the soft tyre.

Qualifying took place at midnight and the track was cooler at 16C. As the track opened for Q1, about two thirds of the cars trickled out on soft tyres, spreading themselves out to prepare for a first push lap. As they completed their fast laps the remainder of the cars came out, so all cars were on track. Cars ran a mix of patterns; some pitted after a couple of fast laps and would come out again later. Others ran between two and four fast laps without making a pit stop. By the last minutes all cars were on track aiming to get the very best from the track. Leclerc topped the timings ahead of Sainz and Russell. Verstappen was fourth. Shock eliminations for both McLarens.

Q2 was next. Eleven cars came out and prepared for a fast lap while four remained in the garage: both Mercedes and Verstappen and Bottas Alfas. The Mercedes' joined as the first group wrapped up their first fast laps, so they were in sync, but with one less lap available. Both Bottas and Verstappen joined at the nine minutes to go mark. The early starters changed tyres and came out for another couple of laps. Leclerc again was top of the list ahead of Sainz and Russell was third. Verstappen was only fifth. Surprise eliminations for Mercedes' Hamilton and Pérez, who was not on track in the final minutes and lost out.

Next was Q3. All except Bottas came out and put a time on the board before pitting for a new set of tyres. Russell ran two warm up laps before going for a push lap while the others returned to the pits. He continued joining the rest of the pack in a final push in the last minutes of the session. Final positions were Leclerc just ahead of Sainz. Verstappen was third and Russell fourth. Sainz would take a ten-place penalty for his drain cover damage repairs, thereby moving Verstappen up to the front row for the race start on Saturday night.

As the teams gridded up for the race, tyre choices were revealed. Majority choice was the medium but a few, mainly those at the back, rolled the dice with the soft or hard tyre. The track was cool at 19C.

The start was messy. Verstappen did his usual thing going wide into T1 and forcing Leclerc to make the call to crash or avoid. Both went wide in T1 with Leclerc ending up second. Russell retained third. Further back Alonso took a charge into T1 and span. Sainz tapped Hamilton and also span in T1. Cool tyres and brakes and the general low grip conspired to make T1 a bit of a crash-fest. A Virtual Safety Car (VSC) was deployed as the cars completed lap one. Pérez, Bottas, and Alonso all pitted for new noses and switched to the hard tyre. Verstappen would pick up a five second penalty as he chose not to give up position to Leclerc and was judged at fault.

The VSC lasted a lap, and they went racing again on lap three. Norris lost his McLaren in spectacular style. He was slightly off the line and hit a small bump in T11. He lost control as under-car downforce was lost, span into the adjacent wall and was then a passenger into the runoff at T12. Norris walked away but visited a local hospital for checks. A full Safety Car (SC) was deployed for cleanup and barrier repair. Stroll in the Aston and Sainz took tyre stops at the end of lap three.

The cars ran round under the SC, weaving to try keep some temperature in the tyres. The SC came back in at the end of lap six and racing resumed. Around lap ten, some of the faster cars at the back began their moves forward: Pérez, Stroll, Alonso, and Sainz.

On lap sixteen, Leclerc who had kept Verstappen in sight, began to put on the pressure and took the lead in T14. Verstappen would then pit to change tyres and serve his five second penalty dropping him to tenth.

On lap seventeen Hamilton and Piastri had a contact that would lead to a Piastri pit stop for a puncture. Hamilton carried on, but front wing damage caused cooling problems on his front right brake, something he would carry to the end of the race.

Verstappen worked his way forward and caught Russell around lap twenty-two as Russell was delayed by Alonso ahead of him. Both cars passed Alonso a lap later and the pressure was on Russell. On lap twenty-five Verstappen stuffed his car up the inside in T12 and there was contact as Russell turned in, probably not expecting Verstappen to be there. Russell had sidepod damage, Verstappen lost a front wing endplate. Both cars continued but a SC was sent out for debris removal. The top cars pitted apart from Leclerc, who resumed the lead but was now at a tyre disadvantage.

Pérez got by Leclerc for the lead on lap thirty-two, but Leclerc was able to regain that lead a few laps later. Meanwhile Verstappen was coming. On lap thirty-seven he passed Leclerc for the lead and would go on to take the flag. Leclerc lost second to Pérez again as he went wide in T12, but in a tense last lap was able to swipe second back leaving Pérez in third. Russell crossed the line fourth but was demoted by a five second penalty for his clash with Verstappen.

Ultimately, Leclerc might have had the legs to win this one, but Verstappen's lap one T1 tricks and the second SC did him in. The final gap was only two seconds, close for this season. None the less it was quite a fun race to watch (Alfa woes aside) with plenty of action up front and of course a stunning backdrop formed by the lights of Vegas. Overall, a success.

Alfa's Weekend: Las Vegas

Alfa Session Results - Las Vegas							
Driver	FP1	FP2	FP3	Qual	Grid	Race	Gain
BOT	10	5	9	8	7	17	-10
ZHO	14	18	15	18	17	15	+2

For FP1 both Alfas went out with a unique choice of the hard tyre. Perhaps this was a move to use an undesirable set of tyres under the green and dusty track conditions and save the more useful softer compounds for later. Both drivers reported, unsurprisingly, that grip was very low.

The cars were second and third out of the pits. Both went for a couple of fast laps then backed off for a cool/charge, but were asked to keep up the pace for tyre temp. Valtteri was third and Guanyu seventh after these two laps.

As Sainz headed down the Strip towards his drain related incident, Guanyu was following a few hundred meters behind on the same line. When Sainz had contact, there was an enormous shower of sparks and Guanyu reported debris everywhere. Both cars returned to the pits and the session was over. At that point Valtteri was in tenth and Guanyu fourteenth. Subsequent checks revealed some underside damage to Guanyu's car.

Both cars joined FP2 a couple of minutes in with the medium tyre this time. Both cars went for a double push lap with DRS allowed for the second run. Valtteri picked up two seconds on his second lap, good for twelfth. Guanyu picked up four seconds, good for seventeenth.

Both cars did another couple of push laps interspersed with cool/charge laps. Large chunks of time were found as the track improved and Valtteri found himself tenth, but Guanyu could not make gains up the order and was eighteenth.

Valtteri opted to pit whereas Guanyu stayed out for another cool/push sequence. His lap was good for another second and a half, yet he still lingered down in seventeenth. He would return to the pits with twenty-three minutes of the session used.

A minute later, Valtteri came out on a set of soft tyres for a qualifying simulation. He ran three push laps with a cool charge in between gaining time on each attempt. He returned to the pits now fifth.

Guanyu joined on softs as Valtteri completed his first fast lap. He ran a similar pattern gaining time on each try. This time he made good gains and was seventh when

he returned to the pits at the halfway point in the session.

At forty minutes to go, Valtteri came out on a new set of softs. Guanyu was just a moment behind on the same tyre.

Valtteri's first lap was compromised by traffic, so he backed out to recharge then went again. He gained 1.3 seconds and was now eleventh. After a cool/charge he went for another push lap, but a brief Yellow Flag meant he had to back out. He went round and started another push lap. This time he gained another second for fourth. He then returned to the pits.

Guanyu got a clear lap but did not improve on his earlier lap and was now twelfth. After a cool/charge lap he went into another push lap but cut the corner at T8 and backed out. He went round and started another push lap. He gained less than a tenth and was now fifteenth. On his next push lap, he had a lock up in T12 and requested another lap which he was granted. He began immediately, picked up three tenths but was now down in seventeenth. He reported traffic and vibrations from the earlier lock up. He was about a second and a half behind his teammate; his engineer encouraged him to try again to close that gap. He tried one more push lap, but again cut T8 as he reported the grip had gone away, so he returned to the pits with just under twenty minutes remaining.

Meanwhile, as Guanyu came in, Valtteri went out on a set of used softs. He did one fast lap, but he too had a minor lock into T12 so didn't break any records. He was then called in for a pit stop to change to new hard tyres to join the rest of the pack on high fuel race simulations. A couple of minutes from the end he stopped for a change to used mediums. He ran an out lap and one push lap, took the flag, and went round for a grid practice start.

At eleven minutes to go, Guanyu came out on the used soft tyre. He did one lap, pitted for used medium tyres, and went back out for his race simulation. He ran out the clock and went round for a grid practice start.

Final positions were a fine fifth for Valtteri and a poor seventeenth for Guanyu.

For FP3, both cars went out a few minutes after the green light with both on fresh soft tyres. They went for a first push lap. Guanyu had a huge front right lock up leading in to T14 resulting in a flat spot and high vibrations. He declared the Alfa un-drivable so took to the pits after his cool down lap.

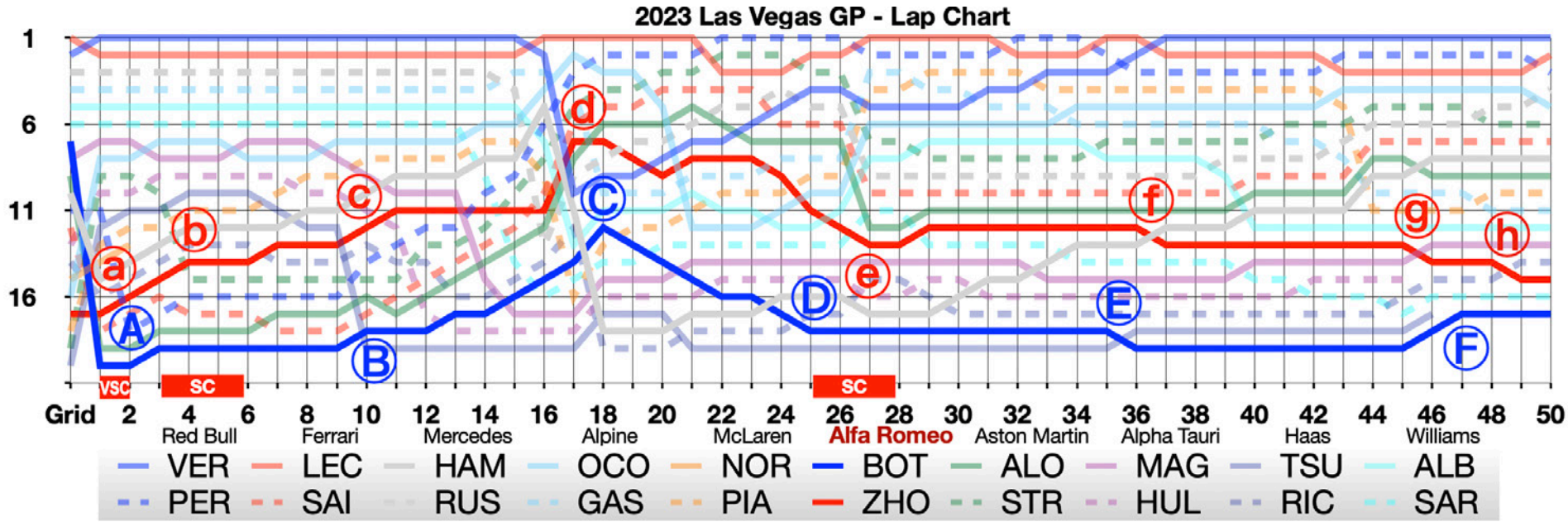
Valtteri went on to start a second push lap after his single cool/charge lap. He picked up a second and a half, recording the fastest lap but with only six times on the board. After a cool/charge lap he ran another push lap, shaving another three tenths, and was now in third place behind the Ferraris. After a cool/charge lap he moved straight into a six-lap race simulation without pitting for fuel or tyres. However, on his fourth lap he reported tyre graining and that the rears were gone. He had a rear lock up overshooting T14 just before he pitted at the end of that lap and had now dropped down to twelfth with thirty-five minutes remaining.

Just past the halfway point, Guanyu came out again on new soft tyres. He ran three push laps with cool/charge laps in between. He again picked up large gains with his third try bringing him up to seventh. He went for a fourth try, but he locked up and overshot at T1, so backed out. He went for one more push lap but reported vibrations, so this push lap was not faster. He reported the track felt faster but that the vibrations were distracting him. He agreed to one more push lap after his cool/charge to get more track time. He picked up another tenth for thirteenth then pitted.

Valtteri rejoined at eighteen minutes to go on new soft tyres. His first push chopped another three seconds off the time for fifth place. After a cool/charge his next push lap was only a tenth faster. His third and last push lap was not faster; he pitted at the end of the cool down lap.

As both cars were coming in Albon had contact with the wall bringing out a Red Flag and ending the session. Final FP3 positions were Valtteri ninth and Guanyu fifteenth.

For qualifying both cars came out on new soft tyres joining a short queue waiting for the green light in the pit lane. Being out



early they went briefly high up the board. Both took a cool/charge lap before going for another push lap. Guanyu picked up a second and a half for ninth and Valtteri picked up just over a second for fifth. Both cars were instructed to do a fast in lap and pit.

Both cars swapped on another new set of soft tyres and came out again for a final try. Guanyu picked up three quarters of a second for thirteenth, Valtteri gained almost a second for fifth. Both cars received status updates as they ran a cool/charge lap prior to one last push lap at the end of the session. Tsunoda had an off and brought out a Yellow Flag that ruined Valtteri's fast lap, but his prior time kept him seventh and he would advance to Q2. Guanyu was ahead of Tsunoda, so was not impacted, but unfortunately his lap was not quicker. His final position was eighteenth ending his qualifying run.

On to Q2. Valtteri sat out until about nine minutes to go. He came out on new soft tyres and ran a double warm up lap before going for his first push lap. He logged tenth and had time for a cool/charge and one more push lap. He picked up four tenths which was good for tenth again moving him onwards to Q3.

Valtteri sat out the opening part of Q3 leaving the garage with five minutes remaining on the clock. He ran a fresh set of softs and went round twice before starting a push lap with under a minute remaining. He would rank eighth, a fine result with potential for points in the race.

Come Raceday (or Race night in this case) Valtteri gridded up on the medium tyre in seventh, gaining one spot as Sainz took his penalty. Guanyu took a hard tyre and started seventeenth as Stroll took a penalty.

Off the line Valtteri held position into T1 but Alonso span, rotated 180 degrees and the two had nose to nose contact. As Valtteri stopped, Pérez tapped him from behind leaving him with diffuser damage. Valtteri got going but was at the back and pitted at the end of the lap for a nose and hard tyres. He rejoined further off the back, about half

a lap down (A), with obviously low grip on the hard tyre. His race was ruined as he could never recover from this deficit.

For what it was worth he gained a position as Norris crashed on lap three. The good news was that the SC allowed him to reconnect with the back of the pack. At the end of lap ten, Tsunoda took a stop (B) and a move forward began as pit stops started. Valtteri reported he did not have the grip to keep up with the cars ahead. He reached a high of twelfth (C) before the payback began and he slid backwards to eighteenth (D). His tyres were beginning to grain around lap twenty-two. His challenge was to make them last long enough to get onto a set of mediums in a single stop strategy.

At the end of lap twenty-four he pitted for those mediums. He would need to manage these tyres in the early laps if he was to make it to the end and he did not get the benefit of the SC that happened shortly after his stop. He tried to keep up with Ricciardo ahead in the Alpha Tauri, but slowly lost contact falling back into the clutches of Tsunoda in the other Alpha Tauri. Tsunoda got by pretty easily on the Strip on lap thirty-six (E). A small bonus came in the closing laps as both Hülkenberg and Tsunoda retired moving Valtteri up to his final position of seventeenth (F). Such was his lack of pace in this stint that he had gone from hanging onto the tail of the pack to almost being lapped by the leader at the end of the race.

Guanyu had a good start and avoided the stationary cars ahead and ended up a place up coming out of T2. Ricciardo was now ahead and Guanyu had a good look into T5. Piastri zoomed by in T6, and he was back to seventeenth (a). Pérez pitting was worth one spot on lap two as was Norris' crash on lap three. Stroll stopped at the end of lap three and another place was gained; now he was fourteenth and behind the SC (b).

On the restart, Guanyu made a pass on Ricciardo on the way to T5. Tsunoda was now ahead but went wide in T1 at the start of lap ten bringing Guanyu up to twelfth (c). On lap eleven he dispatched Hülkenberg down the Strip for eleventh. He remained there gaining spots from pit stops but losing spots as faster cars came by. That balance shifted as more cars pitted and he climbed to his highest point of seventh (d). As is often the case, the cars that pitted recovered position and Guanyu dropped slowly back culminating in a pit stop at the end of lap twenty-six under the SC (e), where he took medium tyres to go to the end.

On the restart lap, Guanyu was able to pass Sargeant on the way to T5 for twelfth with Alonso now ahead. Status quo was held for the next seven laps until Hamilton, on a recovery phase, got by on lap thirty-seven (f). Around lap forty-two Guanyu got within DRS range of Albon, but he couldn't get close enough for a challenge. Meanwhile Magnussen was catching and took position on lap forty-six (g). On the penultimate lap, Ricciardo took a place down the Strip leaving Guanyu in his finishing fifteenth position.

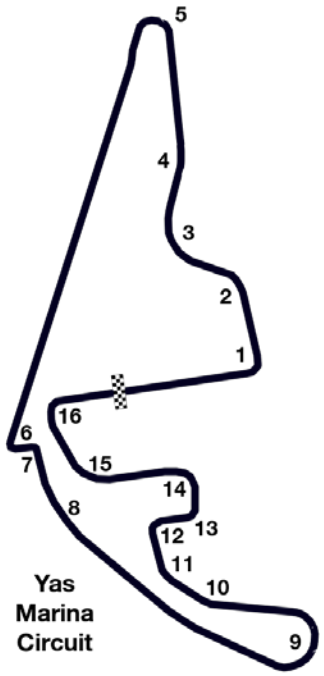
Overall, a disappointing race. Initial hopes were dashed by the T1 incident which left some damage on Valtteri's car that would hamper him through the race. Guanyu did gain a couple of spots, but his tyre degradation was high in the last stint. Once again, near rivals did not score points but any advance from ninth in the Constructors was looking unlikely. One more race to try.

Race 23: Abu Dhabi

By contractual agreement Abu Dhabi's Yas Marina Circuit hosts the final race of the season. So, either it can be a tense finale to a close season (2021) or a bit of a last day of school feeling if the championships are all tied up (2023).

The circuit is a 5.2 km loop built for the 2009 season. It's a custom track offering plenty of space and run off areas with little in the way of elevation change. Tweaks were made for 2021 to improve the flow a little, but it is not a track that yields non-stop action.

A couple of long straights on one side are joined a couple of twisty sections on the way back as the circuit follows the marina. The track's signature feature is where it runs under a hotel at T13/14. Another unusual track layout detail is that the pit exit



passes through a tunnel to rejoin on the opposite side of the track.

This being another desert race, it is held under lights after sunset although some practice sessions are under the natural sunlight. Race distance 58 laps.

Weekend Overview: Abu Dhabi

A few updates, mainly aimed at 2024, were in play. Alpha Tauri had a new floor, Alfa Romeo a new front wing.

On the docket for the weekend was second in the constructor's Championship with Mercedes just four points ahead of Ferrari. Sainz was trying to retain his lead over Leclerc at Ferrari. A bit more of a long shot for Aston, who were just in with a chance to take fourth from McLaren and Alpha Tauri, who were close to Williams for seventh.

In keeping with the current trend, the FIA were experimenting with some AI based tools to try to get instant and definitive track limits judgements.

The FP1 line up looked quite unfamiliar as teams used this last opportunity to run their rookie/reserve drivers as required by the rules. Ten cars were under command of these young drivers:

Alfa: Theo Pourchaire in for Zhou
Alpine: Jack Doohan in for Ocon
Aston: Felipe Drugovich in for Alonso
Ferrari: Robert Shwartzman in for Leclerc
Haas: Oliver Bearman in for Hülkenberg
McLaren: Patricio O'Ward in for Norris
Mercedes: Frederick Vesti in for Hamilton
Red Bull: Jake Dennis in for Verstappen
Red Bull: Isak Hadjar in for Russell
Williams: Zak O'Sullivan in for Albon

Many of these drivers also had to compete in the F2 finale this weekend.

In the early laps many cars had various aero appendages applied to capture airflow data. Typically, one clean lap at modest pace is all the team needs to get a correlation to the CFD airflow simulations they use for much of their design work.

FP1 was held under sunlight and the track was at a warm to hot 42C, not the same conditions as would be experienced in the race. A gusty wind was also at play. FP1 was a bit difficult to assess given the grid make up. Early laps were predominantly on mediums in the first half. Later in the second half, everyone had a go on softs, including the rookies who often only get a single tyre set to use. Several cars had moments in the final corner due to the variable wind. Russell was quick and occupied the top spot for most of the hour, including at the conclusion. Second was Drugovich and Ricciardo third. Sainz was seventh, Shwartzman eighth.

FP2 began as the sun began to go down and the track was cooler at 34C. All the cars came out over the course of the first few minutes, almost all on medium tyres. They went about their business logging times. At eight minutes in, Sainz had a big spin and went off in T3. He appeared to hit a bump and lost the car, damaging its left side and disturbing the barrier. Several drivers had previously highlighted this bump. A Red Flag was duly raised. Many drivers who sat out FP1 would lose considerably more track time.

The session resumed with twenty-six minutes remaining and all cars except Sainz hit the track with a mix of soft and medium tyres. However, just as Magnussen began his push lap, he put a wheel over the curb in the exit of T1 and span damaging the rear of his Haas. This brought out another Red Flag. Once again, time was lost

but the marshals did a good job, and the track went green with fifteen minutes on the clock.

Overall, Leclerc was fastest, Norris second, and Verstappen third. Verstappen was not happy with the car set up at this point. Sainz was nineteenth after his crash.

With much time lost either to rookie testing or Red Flags there would seem to be much to do in FP3. A warm 43C track may have been a bit of a deterrent as cars came out at a leisurely rate. Sainz was out early in his rebuilt Ferrari; no penalties were accrued for parts changes. Overnight, the bump in T3 was attended to.

In the first half, all cars except the Ferraris ran soft tyres; the Ferraris were on mediums. Traffic died down a bit until ten minutes to go when most cars came out again on softs for a final qualifying practice run.

Russell was fastest ahead of Norris and Piastri. Verstappen was only fifth. Leclerc was fourth and Sainz was last.

Qualifying took place later in the day, after dark, with the track fully electrically illuminated. The track was down to 32C.

No one wanted to be first on track so there was a bit of a pause after the track opened for Q1. About four minutes in, the cars began to appear. The last cars came out as the first began their first push laps. After a single push lap, all the cars returned to the pit. Three cars had their times deleted for track limit violations. At this point Verstappen was fastest but considerable track evolution was expected. The Williams pair came out at about six minutes to go and got the opportunity to do a couple of laps, the first on a clear track. The rest of the cars started to move at about the four-minute mark. There was a bit of a queue out of the pit, as the cars went slow to make a gap. Cars duly ran faster, and the final order was Verstappen ahead of Pérez and Tsunoda. Leclerc was tenth, but Sainz was eliminated in fifteenth.

On to Q2. Albon came out after a minute and the rest of the cars began to emerge another minute later. All cars except Verstappen took used softs. Verstappen on new softs was easily fastest. With times on the board, all cars returned to the pits. At six minutes to go Albon was once again first out to attack the final lap with a clear track. The rest began to come out a couple of minutes later with opportunity to get one fast lap. Verstappen stayed in the garage assuming his earlier lap would be good enough. His confidence was well founded as he finished at the top followed by Norris and Leclerc. Hamilton was out in eleventh.

On to Q3. Verstappen was keen to get on with it and came out first. Others came out over the next minute or so. After the first laps, Verstappen was fastest, and Leclerc was in ninth. Cars returned to the pits for a final set of tyres to use in their final push for pole. The final order had Verstappen on pole, Leclerc recovered to second, Piastri third, and Russell fourth. Norris had a wobble and could only log fifth. Tsunoda recorded a fine sixth and Hülkenberg was eighth.

Next was the race on the following day. Cars started mainly on mediums. A few of the rearward cars chose the hard tyre to go longer into the opening stint. The track was at a modest 34C and the shadows were lengthening.

Off the line Verstappen retained the lead. Norris got ahead of Russell for fourth. As the cars headed into T6, Leclerc was alongside Verstappen but could not get the pass done. Norris made an easy pass on Piastri for third on lap four. Piastri fell back into the clutches of Russell and after a couple of attempts the Mercedes driver took fourth on lap eleven.

Russell and Norris pitted together at the end of lap fourteen. Norris had a slow stop and Russell would exit the pit lane ahead, effectively now third on the road. Norris pitted again at the end of lap thirty-three triggering second stops for those who were running that strategy.

A clumsy pass attempt by Pérez on Norris on lap forty-seven resulted in a small contact and would cost Pérez a five second penalty. He would make a better job of it a lap later in the same corner. He overtook Russell on lap fifty-four and caught Leclerc.

Leclerc, in a vain attempt to use Pérez' penalty to his advantage, and to Russell's disadvantage, allowed Perez past on the final lap. This was a tactic to try to boost Ferrari to second in the Constructor's. It was a marginal call, and in the end Verstappen would win. Leclerc regained second due to Pérez' penalty, and Russell was still third, as Pérez ended up fourth. This was sufficient to ensure Mercedes took second place in the Constructor's Championship.

McLaren held off Aston for fourth and Williams bested Alpha Tauri for seventh.

Sainz held out for a Safety Car and was forced to pit on the final lap as he had not used the required two tyre compounds. This would drop him to the back and so he did not bother to rejoin the fray. His was the only retirement. Given this was the last race in the season with all components at their maximum life, it was surprising that there were no mechanical issues in this race.

Alfa's Weekend: Abu Dhabi

Both cars retained their Vegas livery, probably the team seeing no need to spend money on redecorating for this last race only.

Theo Pourchaire took Guanyu's car out in FP1. Theo also had to race in F2 this weekend to cement his championship, so the F1 run was a major distraction from his F2 task. He handled it well and would later take the F2 championship.

Alfa Session Results - Abu Dhabi							
Driver	FP1	FP2	FP3	Qual	Grid	Race	Gain
BOT	4	4	16	18	18	19	-1
ZHO	—	7	10	19	19	17	+2
POU	14	—	—	—	—	—	—

In FP1, Valtteri went out on mediums with some aero rakes attached behind the front wheels to investigate airflow from the new front wing. Theo took Guanyu's car with the hard tyre and they joined the queue to get out on track as soon as it opened. Valtteri drove carefully to keep a clean set of readings. He came in at the end of the lap, did a nose change and went out again to collect comparison data. He ran one out lap and returned to the pit.

Theo ran just an out lap before returning to the pit and was pushed into the garage.

At fifteen minutes in, both cars came back out on the same tyres. Valtteri had rakes on the rear end of his car this time. He went for a fast lap with the measurement equipment attached. He logged eighth and went into a cool/charge lap then another push. He gained half a second and fourth place. Another cool/charge then push followed. This time he lost a couple of tenths and was in sixth. Given a choice, Valtteri opted for another push lap which he duly did after a single cool/charge lap. He fractionally beat his best time and was now seventh. He would pit after a cool down lap and the session was half done.

Theo also went for a fast lap and logged sixteenth. A second push lap immediately followed, and he gained two and a half seconds for fifteenth. He took a cool/charge lap then another push lap. He went a tenth slower and was now in eighteenth. He reported bottoming in T2/3 and that he nearly lost the car. Another cool/charge lap was followed by another push lap where he gained nine tenths. He was much happier with the lap but reported rear tyre overheating. He would pit at the end of a cool down lap.

At twenty-two minutes to go, Theo came out on a new set of soft tyres. He went for a push lap gaining a second and sixteenth place. He ran a double cool/charge lap before another push lap. He picked up seven tenths getting to seventh, then took another double cool/charge lap. He picked up another seven tenths and jumped up to eighth, just a couple of tenths behind Valtteri before pitting.

Valtteri came out, also on the new softs just as Theo began his push lap. On his push lap he picked up six tenths and went to seventh then took a double cool/charge lap before pushing again. He picked up four seconds and jumped to second despite some traffic. He was asked to put in a fast in-lap as time was now short with ten minutes remaining. He still had the rear rakes attached.

At six to go Theo came out on his used soft tyres to a busy track. He had time for two push laps split by a cool/charge. He was slower on his first try and reported bottoming again in T3. On his second try he again did not improve, getting stuck behind a car running at race pace. He returned to the pits to park and rush over to join his first F2 session.

Valtteri cut it finer rejoining at three minutes also on used softs. He just got in a fast lap but was three tenths slower. He would go round for a grid practice start. Afterward he took an interview with Sky TV over the team radio as he drove back to the pits.

A good result for Valtteri in fourth, possibly flattered by high rookie content. Theo put in a good fourteenth with a clean session.

For FP2 both cars were out on the green light towards the front of the queue. Guanyu had on a new set of mediums, Valtteri a new set of hard tyres. They went round and began their push laps. Initial placements were high as they were amongst the first out. After a cool/charge lap they went for another push. Both picked up a half second, Valtteri went to eighth. Guanyu to twelfth. Guanyu reported a lot of traffic. Guanyu requested, and was granted, a double cool/charge to recover his tyres. Unfortunately, neither driver could go further as a Red Flag for Sainz' crash was thrown. Both cars returned to the pit.

After the Red Flag both cars came out on new soft tyres but had to abort their first push laps for the second Red Flag.

Both cars would come out again on the partially used softs. Both cars gained over a second and a half, Valtteri went to top of the list and Guanyu was behind him at second. Valtteri pitted. Guanyu again requested, and was again granted, a double cool/charge lap before he went for another push lap. He reported a lock into T6 on his last lap. He still picked up a tenth and was now third. Guanyu did not have time to come in to prepare for race pace laps, so he decided to try one more push lap on the now used soft tyres. He did a double cool/charge then went for the final push lap. He was just a fraction slower and was now fifth.

Valtteri rejoined at seven minutes to go on used hard tyres. He ran a sequence of four high fuel race pace laps so didn't improve his time, but he finished the session in fourth. Guanyu dropped to seventh by the end. Both cars went round for a practice start on the grid after the flag.

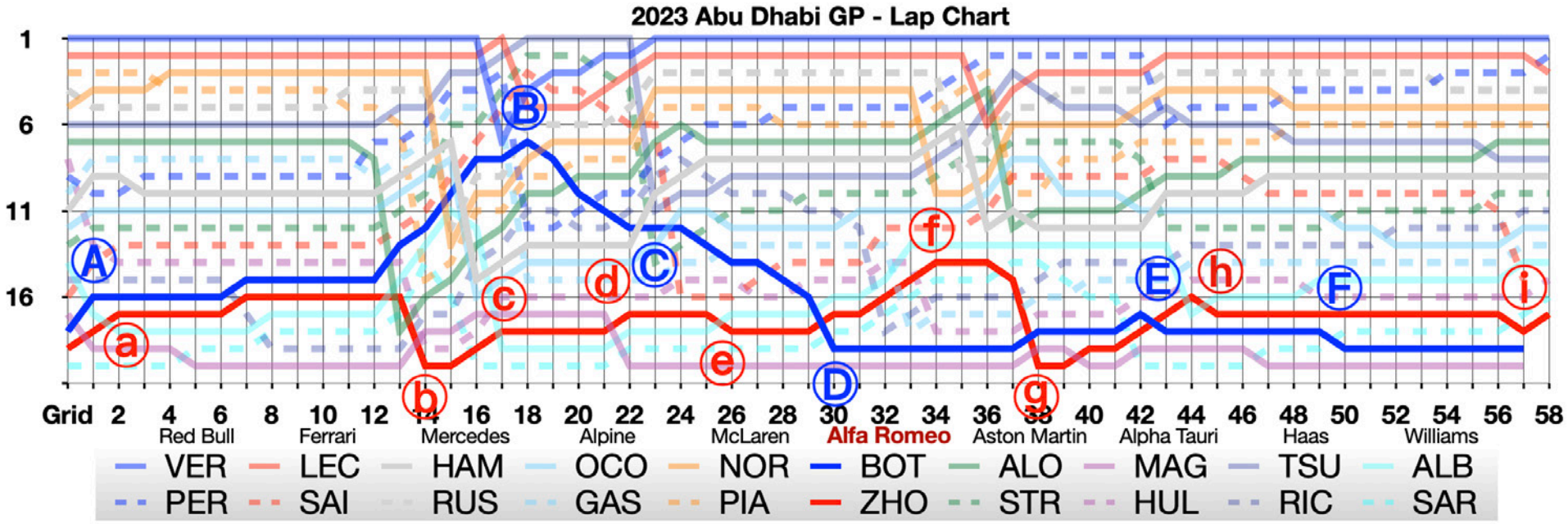
In FP3 Guanyu came out at about the eight-minute mark with new soft tyres fitted. On his first push lap he had a big snap in T6. He went on to a double cool/charge lap before running another push lap which was almost half a second faster and in tenth position. He was asked if he wanted another lap, but he declined and returned to the pits.

Valtteri hit the track fifteen minutes into the session on the new soft tyre. He could only manage fourteenth position on his first push lap. Not a great start. He did a double cool charge then went again. He picked up seven tenths and went up to eleventh then returned to the pits. Twenty-five minutes had elapsed.

Just before the halfway point, Guanyu came out on used soft tyres. He ran consecutive laps at race pace for about ten minutes before returning to the pits. By now he was down in nineteenth and there were twenty minutes remaining.

Just after Guanyu came in, Valtteri went out on a new set of softs. On his first push lap he locked a wheel into T1 and went wide. He backed out of the run, went aound and tried again. He was half a second faster and up to eleventh again. When asked if he could do a single cool/charge, he replied in the negative and went on to do a double cool/charge. He went just a tenth faster and was now thirteenth. He would run into the pits for a practice stop and was then pushed back into the garage with just six minutes remaining.

Guanyu came back out with just under fifteen minutes left sporting new soft tyres. His first push lap was one and a quarter second faster, resulting in him jumping up to seventh. He ran a double cool/charge, then went for another push lap in which he wasn't faster. The team and driver debated going again. There was just time for a double cool and push and the team asked him



to make that run to dial in a couple more corners. He was happier but the old tyres meant he was three tenths off his best. He went round and did a grid practice start.

Valtteri came out with just over a minute to go. He went round took the flag and then ran a grid practice start.

Final FP3 scores were Guanyu tenth, Valtteri sixteenth.

On to qualifying. The cars came out mid pack, both on new softs. Valtteri went to seventh, Guanyu to ninth. However, Guanyu had his time deleted for track limits violation, so he now was on the back foot with no time on the board. Both cars pitted.

They came back out with the pack at four minutes on new softs. They went round and began their one push lap. Guanyu was only eighteenth having had a lock up into T6. Valtteri would take eighteenth, knocking Guanyu to nineteenth by the time all was done. Thus, both exited qualifying.

For the race, Valtteri was one of a few on the hard tyre and Guanyu took the majority choice of the medium. As had been heard throughout the weekend, Valtteri was told not to use neutral as he lined up for the start, as there was some sort of ongoing gearbox issue.

Off the line Valtteri got a good start passing Magnussen and following Sainz past a slow starting Albon. Magnussen would get back by briefly in T1 before Valtteri once again passed him in T3. Ricciardo was passed in to T6 only to give back the spot inT9. Valtteri was sixteenth at the end of lap one with Ricciardo immediately ahead and Albon close behind (A). Ricciardo took a stop at the end of lap seven to clear a potential tear off from his front brake duct, a spot was gained for Valtteri.

Around lap thirteen, cars ahead began to pit and Valtteri moved up the order to a high point of sixth on lap eighteen (B). Almost immediately, fortunes were reversed, and he began a long slide backwards as the faster cars regained position. The slide was briefly attenuated as cars on a one-stop strategy began to pit on lap twenty-three (C) but resumed thereafter. At the end of lap twenty-nine he pitted for his single stop

taking medium tyres on board. He would rejoin in nineteenth (D). Unfortunately, that was really the end of his race. He did pick up a couple of places as others took to the pits but lost them again, including a team ordered swap with Guanyu on lap forty-three (E) and a pass by Sargeant on lap fifty (F). He would finish the race in nineteenth position.

Guanyu got off the line well enough, but Sargeant found his way by in T3. Guanyu was able to retrieve the position into T5. He passed Magnussen in T6/7. On lap two, he passed Albon in T6 for seventeenth at the end of lap two (a). Ricciardo, ahead, took a stop on lap seven moving Guanyu up a spot. He was still following Valtteri until he himself took a stop at the end of lap thirteen changing on to hard tyres. He would rejoin last (b). Both Williams' would pit on the next laps and a couple of spots were gained (c).

On lap twenty-two Guanyu pulled a pass on Magnussen for seventeenth (d). Meanwhile Albon was closing behind and on lap twenty-six he came by in T9 (e). From there some cars ahead pitted, including Valtteri, and Guanyu would rise to his race high position of fourteenth by the end of lap thirty-four (f). At the end of lap thirty-seven he pitted again for a set of medium tyres coming back out in twentieth (g). He caught and passed Magnussen on the way to T9 on lap forty. A couple of laps later Sargeant took a stop for a place. Guanyu's fresher tyres allowed him to catch Valtteri and on lap forty-three Valtteri let him by in T9. Albon pitted on lap forty-four, but he recovered position from Guanyu on lap forty-five leaving Guanyu seventeenth (h). He would remain there right to the end when Sargeant got by on lap fifty-seven into T9. However, Sainz pitted at the end of lap fifty-seven and Guanyu regained seventeenth (j).

2023 in Conclusion

A very long season of races, perhaps too many? That will be put to the test in 2024 as two more races are planned, including the return of the Chinese GP. Hopefully the weather will not intervene again at Imola.

The dominance of Red Bull, and particularly Max Verstappen, must be recognized, although as we have seen in other eras, this can make for rather predictable races up front. However, we did get plenty of action further down the grid to keep us watching.

The Red Bull team won all but one of the races and Verstappen took nineteen of twenty-two. He led for over a thousand laps. Pérez, while not always the strongest, did win a couple of races and was able to secure a one-two for the team.

For our favourite team, this was not a great year. Hopes were high at the beginning, but momentum was never really achieved. Ninth position in the Constructor's Championship was certainly fair, although a shot at eighth was there for a short while.

The team will continue under the Sauber name in 2024 as they transition to an Audi majority ownership and new Audi powertrain for 2026. A fully new car is scheduled to debut next year as the 2022/23 car has reached its development limit.

Alfa's Title Sponsorship ends with the close of the 2023 season, ending, for now, our direct connection with F1. and as a result bringing to an end this continuous five year run of race reports in Cams. I hope you enjoyed reading about the cooperation between my favourite marque and sport and that I was able to convey the events and goings on in the sport and at the Alfa Team.

Alfa engagement in the FIA World Endurance Championship (WEC) is supposedly under study but no news yet.

Addio per ora e forza Alfa! Cams

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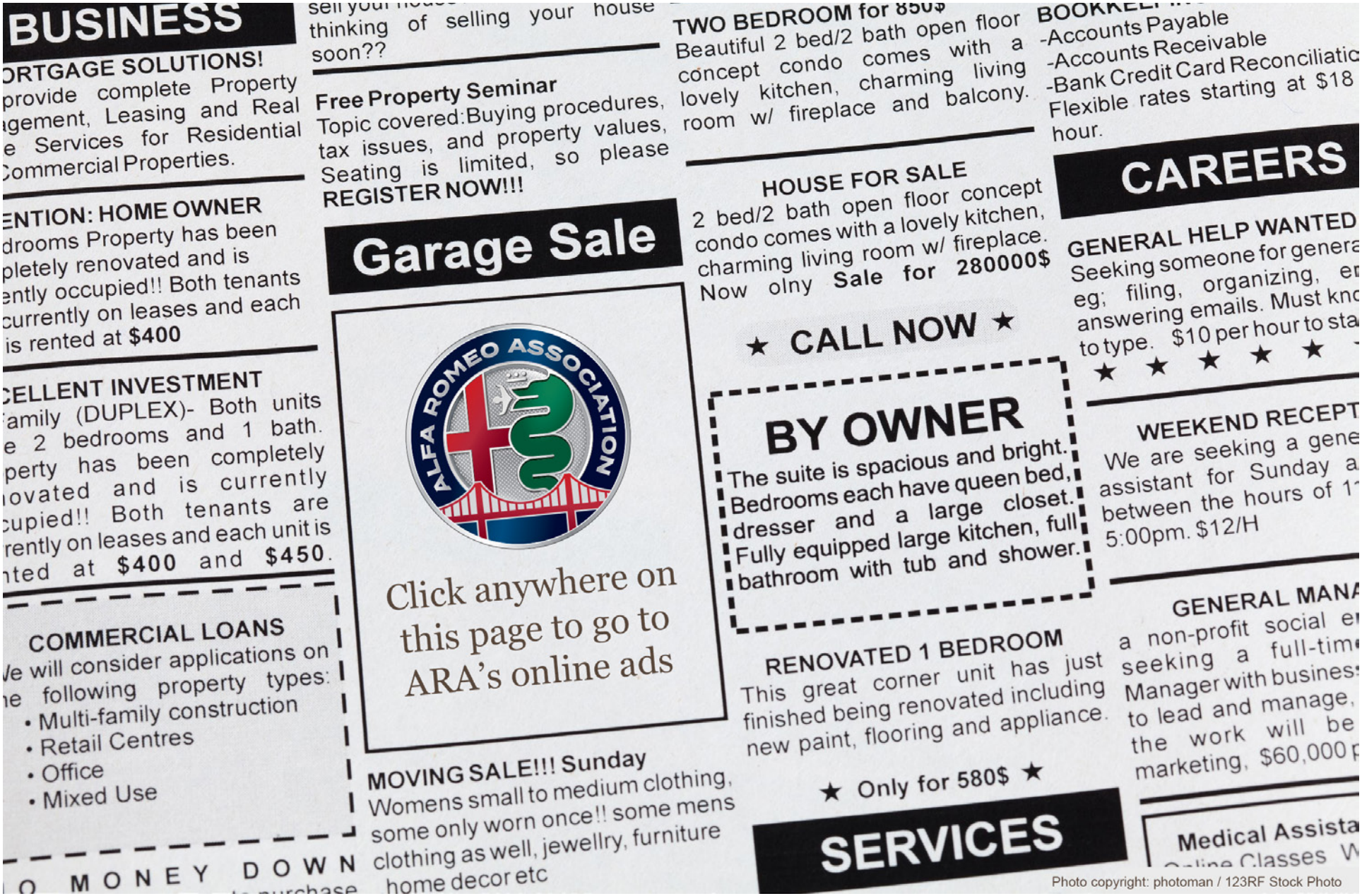

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