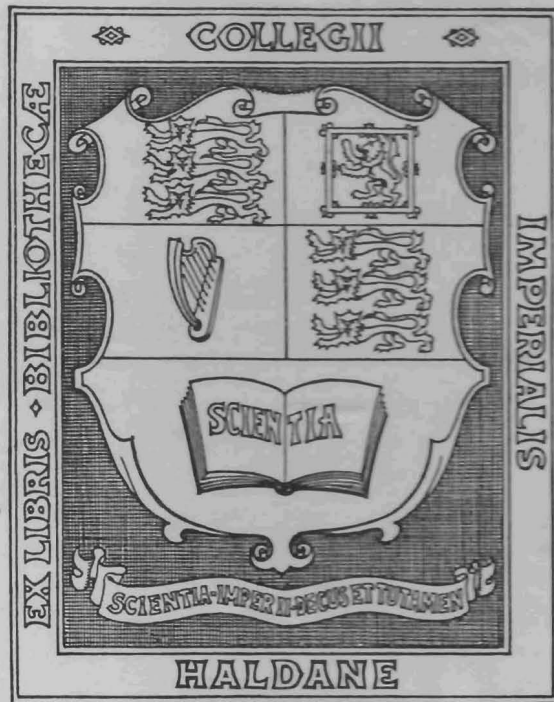


IMPERIAL COLLEGE
OF SCIENCE & TECHNOLOGY

KASHMIR

1960

THE EXPLORATION BOARD



IMPERIAL COLLEGE EXPLORATION BOARD

IMPERIAL COLLEGE KASHMIR EXPEDITION 1960.

FINAL REPORT.

Imperial College of Science and Technology.

January 1961.

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1. Members of the Expedition:

M.J. Armstrong - 3rd Year Physics.
A.D. Duncan - 2nd Year Physics.
D.R. Fulford - 3rd Year Physics.
R.L. Grasty - 2nd Year Physics.
D.G. Murphy - 3rd Year Aeronautics.

2. Aim of the Expedition.

The aim of the expedition was to show that the overland route to Kashmir is possible in a standard production car and to report on the road conditions in the areas passed through.

3. Route.

The route is shown on the sketch map included in this report. The principal towns and cities passed through were:- London, Dover, Calais, Rheims, Basle, St. Gotthard Pass, Trieste, Zagreb, Belgrade, Nis, Thessalonika, Edirne, Istanbul, Ankara, Kayseri, Sivas, Erzurum, Tabriz, Rasht, Teheran, Mashad, Herat, Farah, Kandahar, Kabul, Khyber Pass, Peshawar, Lahore, Jemmu, Srinagar (capital city of Kashmir). The return route was:- Srinagar, Delhi, Amritsar, Delhi, Lahore, Multan, Zuetta, Zahedan, Kerman, Yazd, Qom, ~~Kerman~~, ~~Shah~~, the Iraq border then back to Hamadan, Tabriz, ~~Sivas~~, Ankara, Istanbul, Edirne, Thessalonika, Skopje, Dubrovnik, Trieste, Gross-Glockner Pass, Innsbruck, Schyzz, Lausanne, Rheims, Boulogne, Dover.

4. General Activities.

The expedition left Imperial College on the morning of June 28th, and returned to Dover on September 21st, thus taking twelve weeks and one day to

cover the 16,560 mile journey. Besides our personal gear we took with us a good selection of spares for the car, camping equipment, dried food, tinned meat, drinks and a medical kit.

We arrived in Kashmir on July 31st and established a base camp at Sonamarg, fifty-two miles from Srinagar, on the road to Leh. Here we spent ten days, climbing a few small peaks and going on a three-day pony trek. The last three days of our fortnight in Kashmir we spent on a houseboat at Srinagar, where we saw local craftsmen at work; the wood carving and papier mache work particularly impressed us.

We then went down to Delhi, where we stayed three nights in a Hindu temple, one day going to Agra to visit the Taj Mahal. Apart from these six nights we camped throughout the journey.

On the return journey, after traversing the deserts in South Persia, we were refused entry into Iraq; the reason given was that we had been through Pakistan, where there was a bad cholera epidemic. We therefore had to return to our outward route through Turkey and miss our planned visit to the Holy Land. We also had difficulty in entering Turkey and were lucky to escape five days in quarantine after only twelve hours at an isolation hospital.

At Istanbul D.R. Fulford and D.G. Murphy had to return to England by train in order to start post-graduate work in Canada and the United States of America respectively. We then returned, in almost continual rain, through North Greece, Yugoslavia (going along the Adriatic coast), Italy, Austria, Switzerland and France, to England.

5. Road Conditions.

The road conditions encountered in the various countries were as follows:-

- France, Switzerland, Austria, Italy
(normal tourist countries) - Good roads.
- Yugoslavia
- (i) Border at Triest to Zagreb - Good asphalt road, with cobbled sections.
 - (ii) Zagreb to Belgrade - Excellent "Autoput".
250 miles covered in four hours.
 - (iii) Belgrade to Nis - good "Autoput" but short stretches still under construction.
 - (iv) Nis to Skopje - very bad, gravel, potholed road. One of the worst we encountered
 - (v) Skopje to Greek border - fair asphalt, cobbles and tarmac, then good "autoput" until 50 miles before border, where the road is very bad. A new "autoput" is being constructed alongside the old road.
 - (vi) Skopje to Dubrovnik - Fair or poor gravel roads, often mountainous, with a short good stretch each side of Titograd.
 - (vii) Dubrovnik to Zadar - Fair gravel road, with good asphalt for fifteen miles each side of Split. New road being constructed to Split. from Zadar.
 - (viii) Zadar to Rijeka - good asphalt "Autoput" along the Adriatic coast.
- Greece - Good asphalt or tarmac roads except for short twenty mile stretch to Turkish border near Edirne, where the road is fair gravel.

Turkey

- (i) Greek border to Ankara - good road of asphalt, with stretches of cobbles or tarmac.
- (ii) Ankara to Kayseri - fair gravel road with bad patches to Kersehir, then fair tarmac to Kayseri, with a bad twenty mile stretch fifteen miles out of Kirsehir.
- (iii) Ankara to Sivas - Good gravel road.
- (iv) Kayseri to Sivas - fair gravel road.
- (v) Sivas to Agri - good gravel road.
- (vi) Agri to Iran border near Maku - fair gravel road, with good stretches.

Iran (Persia)

In general, all main roads in Iran are poor, badly corrugated gravel roads, with a very few exceptions. Asphalt or tarmac was usually laid in the towns, no doubt to keep the dust down where people lived.

Exceptions we found were (i) a stretch eighty miles to the west from Teheran (a new highway is being constructed to Kamadan) of good asphalt; (ii) a stretch of forty miles going East from Kermanshah (eventually to Hamadan, no doubt) of good asphalt; (iii) a stretch of sixty miles to the East from Rasht, terminating just east of Ramsar, also of good asphalt; (iv) a fair gravel road on the very impressive Quruk pass which is the main route from Teheran to the Caspian Sea and a stretch of fair to good gravel for eighty miles south from Rasht.

Afghanistan

- (i) From the border
(coming from Mashad) to Herat: bad gravel road often just earth. Bridges over dry river beds non-existent (a very difficult route in the wet season)
- (ii) Herat to Farah: fair or poor gravel (corrugations and bad bridges)
- (iii) Farah to Girislik: fair gravel, though stretches where the road is potholed.
- (iv) Girislik to Kandahar: good gravel (fast road)
- (v) Kandahar to Kabul: bad gravel road - most of the bridges down.
- (vi) Kabul to Jalalabad: fair gravel, mountainous road.
- (vii) Jalalabad to Pakistan
(at Khyber Pass) good asphalt or tarmac road.

Pakistan and India

Throughout Pakistan and India we found the main roads were of good or fair asphalt or tarmac, although they were often little wider than one vehicle width. From Jammu to Srinagar there is a good road, of gravel, which is liable to closure after rain because of landslides. A fair-weather road existed from Srinagar to Sonarmarg, the nearest village to our base camp.

The road from Multan to Zahedan (in Iran) is worth mentioning. After the R. Indus (which we crossed by ferry) the road is good asphalt until after Fort Munroe, when it becomes fair gravel with very bad patches, some as long as a quarter of a mile, until 55 miles short of Loralai. From here the

road is metalled until Sinjari, after where it is good gravel until Zuetta. The next 232 miles are asphalt road, which changes to good gravel which lasts until Nok Kundi, after which the road is very bad, corrugated gravel, often with soft sand covering it.

6. Vehicle Report

The Vehicle used on this Expedition was a Standard Vanguard Estate Car on loan from the Standard-Triumph Group, Coventry.

Preparation

The car was a normal production model apart from overdrive on 3rd and top gear, extra heavy rear road springs, and heavy duty shock absorbers. These however may all be obtained as optional extras.

At our request the luggage compartment was isolated from the rest of the car by means of a plywood screen.

Two roof racks were also fitted to carry the necessary stores and equipment.

The thermostat was removed from the cooling system to improve flow, this being recommended for hot climates.

A fire extinguisher was also fitted, just in case.

Tubeless tyres are normally fitted, but after some discussion with the Service Department, Dunlop "Gold Seal" 6 ply tyres, with tubes, were fitted; an extra tyre and tube being carried to supplement the normal five.

A comprehensive kit of spares was also supplied. (See Appendix 1) As well as undertaking these modifications the Standard-Triumph Service Dept., completely overhauled the car although they only had three days in which to carry out this work.

En Route

When we received the vehicle it had only done 4,811 miles, having been used by the British team at the world Gliding Championships.

Daily checks were made on engine oil level, radiator and battery water levels, and tyres pressures. In addition the road springs were checked for broken leaves and exposed nuts tightened at frequent intervals. Greasing and oil changes were carried out at the recommended mileage intervals.

In order to make best use of the tyres, the new pair were put on the front at approximately one third of the total distance covered.

Apart from a slight oil leak from the back axle caused by bottoming on ridged roads, negligible oil was used even though the shade temperatures reached 110° F.

A major breakdown occurred at 9,000 miles on the India-Pakistan border when the main leaf of a rear road spring fractured. In changing this leaf, the shock absorber was found to be faulty and was also replaced.

With 11,450 miles covered, a burst tyre at 60 m.p.h. was the first indication of worsening tyre trouble.

In all four tyres were completely ruined due to split walls, and sixteen punctures had been repaired by the time we returned to England.

A burnt out dynamo at Istanbul caused no delay since a spare was carried.

Petrol

This was available at reasonable intervals along the entire route, the longest distance between pumps being 300 miles in the Baluchistan desert.

The quality however varied considerably from very good in Iran, at 2/1d a gallon, to exceptionally poor Russian petrol in Afghanistan, at 4/0d. a gallon.

The highest price paid was 6/0d. a gallon in Kashmir.

A total of 770 gallons was used over the 16,645 miles; an average consumption of 21.5 m.p.g.

Conclusion

This vehicle was considered ideal for an Expedition of this nature for the following reasons:-

1. It carried five people, plus approximately 700 lbs. of stores and equipment, in the greatest possible comfort over appalling road conditions.
2. The engine ran perfectly in shade temperatures up to 110°F., only overheating when a following wind reduced the forced draught to zero.

3. It forded rivers up to 18 in. deep with no difficulty.

4. The sump and petrol tank were well protected, and although the

front of the chassis bottomed occasionally on very severe bumps, only a small dent was sustained in the sump.

We would like to take this opportunity of congratulating Standards on producing such a fine vehicle and also to thank the Service Dept., for their great help in preparing the vehicle and supplying spares.

7. Medical

All members of the expedition had smallpox vaccinations and typhoid, paratyphoid, and cholera injections before leaving England. A comprehensive first aid kit was taken, and we were pleased that we did not have to use our bandages i.e. there were no nasty accidents. Cuts, grazes and minor burns we had, and these seemed to take longer to heal in the hot climates, where rose-bleeds were also quite frequent. Two members had spells of athletes foot.

Headaches were not uncommon after hours of driving in the bright hot sun, and sunglasses, as we had expected, were essential. In the Punjab we found sleep difficult because of the hot, humid nights, which we spent lying in - or out of - our tents, perspiring fiercely. Headaches were quite common here.

We were careful to boil all our water from Greece onward, and we bought all our "bread" freshly baked, but even so there was considerable looseness in Iran, and also in India and Pakistan after we had lived on the houseboat where meals were provided. In Afghanistan, food poisoning, or heat, or both, hit the party and two members were very sick for one day. (Treatment was by thalazole).

Salt tablets were essential. Nivaquine was taken as a malaria preventive, mosquitos being found in Pakistan, India and odd places en route.

8. Acknowledgements

The members of the expedition are very grateful to Standard-Triumph Ltd., who lent us the expedition vehicle, and spares. We would also like to express our thanks to the following, who helped us in various ways:-

The Imperial College Exploration Board.
British Pharmaceuticals, (May and Baker) Ltd.,
The British Drug Houses Ltd.,
Australian Dried Fruit Board.
Thomas Black and Co. Ltd.,
Cadbury-Fry Ltd.,
Cerebos Ltd.,
Estcourt Ltd.,
Felton and Crepin Ltd.,
Glaxo Laboratories Ltd.,
Horlicks Ltd.,

Horniman and Co. Ltd.,
Ilford Ltd.,
Kodak Ltd.,
Marmite Ltd.,
Ministry of Agriculture, Fish and Food.
The Nestle Co. Ltd.,
Oxo Ltd.,
Quaker Oats Ltd.,
George Romney Ltd.,
The Scout Shop.
Symington and Co. Ltd.,
Tate and Lyle Ltd.,
Unicream Ltd.,
Van de Burghs Ltd.,
Wander Ltd.,

APPENDIX 1

List of Spares carried for the 20511 Estate Car.

- 1 Front Road Springs (Green)
- 1 Rear Road Spring (10 Leaves)
- 1 Brake Masters Cylinder.
- 1 Slave Cylinder.
- 2 Tins of Lockreed Brake Fluid
- 2 Fan Belts.
- 1 Engine Mounting.
- 1 Gearbox Mounting.
- 4 Road Wheel Nuts.
- 1 Front Shock Absorber. (Teleflo)
- 1 Rear Shock Absorber. (Teleflo)
- 1 Front Flex. Brake Pipes.
- 1 Rear Flex. Brake Pipes.
- 1 Overdrive Solenoides.
- 1 Top Ball Joints with Nuts.
- 10 25 Amp Fuses.
- 1 Flasher Unit.
- 1 Wiper Blades.
- 1 Dynamo.
- 1 Oil Filter. (Complete)
- 1 Oil Filter. (Gasket)
- 1 Hub Front)
- 2 Hub Races)
- 1 Hub Nut) -----Complete
- 1 Hub Felt)
- 1 D. Washer)

- 1 Half Shaft)
- 1 Rear Hub)
- 1 Races) ----- Complete
- 1 Race Housing)
- 1 Hub Nut)
- 1 Washer)

- 1 Coil.
- 1 Petrol Pump..
- 1 Petrol Pump Gasket.
- 3 Rubber Pipes.
- 1 Carb.
- 1 Thick Carb. Gasket.)
- 2 Thin Carb. Gaskets.) -----In Continental Touring Kit.

- 1 Clutch Master Cylinder.
- 1 Continental Kit.
- 1 Foot Pump.
- 1 Hydraulic Jack.
- 1 Service Manual.
- 1 Fire Ext.
- 2 Tyre Levers.
- 1 Repair Outfit.
- 1 Box of Bolts, Nuts etc.,
- 1 Heater Hose (Long)
- 1 Heater Hose (Short)
- 2 Brake Bleeding Hoses.
- 1 Radiator Tap.

<u>DEBIT</u>		£	s.	d.
	Balance Carried forward	171	10	4
June	24th Thomas Elack's Account	10	2	8
"	25th Robinade, Plastic Bags, Biscuit Tins	1	14	0
"	27th Flysheet		10	0
"	27th French Petrol Coupons	6	0	10
"	27th Expenses to Coventry to Collect Car	1	2	0
"	27th Expenses to Teddington A.B.C.		7	0
"	28th Petrol and Grease at Dover	2	0	8
"	28th Phone Call to Standards		4	0
	29th Medical Supplies	3	17	2 $\frac{1}{2}$
"	29th Polyrolls.		3	0
 <u>Expenditure after Istanbul</u>				
Sept.	18th Repair Patches		3	4
"	18th Second-hand Tyre	1	5	0
"	23rd Postage		4	6
"	27th Insurance for Tent		4	6
"	29th Single Fare from Coventry.		15	0
	Food ordered by College.	50	10	1
	*Petrol from Istanbul	21	18	0
		<hr/>	<hr/>	<hr/>
		272	12	1 $\frac{1}{2}$
	Expenditure during Expedition	183	5	11
		<hr/>	<hr/>	<hr/>
	<u>TOTAL</u>	£455	18	0 $\frac{1}{2}$

<u>CREDIT</u>	£	s.	d.
M.J. Armstrong	33	0	0
A.D. Duncan	33	0	0
D.R. Fulford	33	0	0
R.C. Grasty	33	0	0
D.G. Murphy	33	0	0
Exploration Board Grant	50	0	0
*Foreign Monies in Hand at Istanbul	18	3	6 $\frac{1}{2}$
Money from sale of Chev. Truck	24	10	0
<u>TOTAL</u>	<u>£257</u>	<u>13</u>	<u>6$\frac{1}{2}$</u>
 Total Expenditure	 £455	 18	 0 $\frac{1}{2}$
Total Credit	£257	13	6 $\frac{1}{2}$
	<u>£198</u>	<u>4</u>	<u>6</u>
 Contribution required from each Member	 <u>£39</u>	 <u>12</u>	 <u>11d.</u>

Individual Accounts

	£	s.	d.
1. <u>D.R. Fulford</u>			
General	39	12	11
Camera Insurance		12	6
*Films	5	12	1
Personal Expenses	22	2	3
	<u>67</u>	<u>19</u>	<u>9</u>
Paid to date	66	2	3
Balance to pay	<u>£1</u>	<u>17</u>	<u>6d.</u>

2. D.G. Murphy

	£	s.	d.
General	39	12	11
Camera Insurance		16	5
*Films	17	18	8
Personal Expenses	19	9	8
	<hr/>	<hr/>	<hr/>
	77	17	8
Paid to date	74	12	9
	<hr/>	<hr/>	<hr/>
Balance to pay	£3	4	11d.

Additional Expenses incurred by M.J. Armstrong
A.D. Duncan and R.L. Grasty after Istanbul

18 5 5½

i.e. £6 ls. Od. per person.

3. R.L. Grasty

	£	s.	d.
General	39	12	11
"	6	1	10
Camera Insurance		8	6
*Films	6	14	6
Personal Expenses	14	16	5½
	<hr/>	<hr/>	<hr/>
	67	14	2½
Paid to date	65	0	0
	<hr/>	<hr/>	<hr/>
Balance to pay.	£2	14	2½ d.

4. A.D. Duncan

	£	s.	d.
General	39	12	11
"	6	1	10
Personal Expenses	7	7	5
	<hr/>		
	53	2	2
Paid to date	52	10	0
	<hr/>		
Balance to pay		12	2d.
	<hr/> <hr/>		

5. M.J. Armstrong

	£	s.	d.
General	39	12	11
"	6	1	10
Camera Insurance		8	6
*Films	7	16	11
Personal Expenses	12	18	7 $\frac{1}{2}$
	<hr/>		
	66	18	9 $\frac{1}{2}$
Paid to date	66	18	9 $\frac{1}{2}$
	<hr/>		
Balance to pay	-	-	-

Further explanation of Items marked *

1. Petrol from Istanbul

Return Mileage from Istanbul to Standards: 2766

Outward " " " " 2400

Additional Mileage 366 miles.

Total Cost of Petrol: £25.26

Contribution to General Fund: $\frac{2400}{2766}$. 25.26 = £21. 9 = £21. 18s. Od.

2. Foreign Monies in hand at Istanbul

	£	s.	d.
5 Jordan Dinars)	4	14	8 $\frac{1}{2}$
33 Syriion Pounds)	2	13	0
2 Indian Rupees)		2	1
3 Pakistan Rupees)		3	0
45 French Francs	3	6	8
1,000 Italian Lira		11	7
40 Greek Dracma		9	6
6,000 Yugoslav Dinar	5	7	0
20 Turkish Lira		16	0
	<u>£18</u>	<u>3</u>	<u>6$\frac{1}{2}$</u>

3. Films

For 34 films Total Cost £38 2 2d.

i.e. £1 2s. 5d. each

All balances to pay have now been paid and the account closed.

