

The automobile on ice and snow
Domestication of the automobile in Norway
1912-1926
B.Toldnes, North Troendelag University College - Norway

1.1 Introduction

When the first automobiles came to Norway around 1895 they were called «horseless carriages» with an uncertain use. The name indicates, however, that the automobile was a carriage without a horse, telling that we were facing a new period in road communication. The automobile was a vehicle seemingly able to challenge the horse and carriage. Its domination over the horse was, however, still well into the future.

The horse was a «tamed» animal. The taming process made it possible to use the horse both in farming and racing. The taming did not only affect the animal. It also affected the user. Silverstone, Hirsch and Morley use the concept of *domestication* to describe how artefacts are integrated into what they call «the moral economy of the household».¹ Their approach points out that an artifact is negotiated when the meaning and the use of the artifact is concerned. Metaphorically, this concept shows the need to «tame» facts and artifacts that are taken from a «wild» outside world and put into a domestic setting. Thus domestication is a way of theorising what the cultural appropriation of technology is all about. Where the automobile is concerned it raises an interesting question: To what extent did the users of the automobiles influence its technical solutions and use? Is it possible to find examples to show that the automobiles were formed and shaped locally, and technically adapted in accordance with local needs?

In Norway as in many other European countries the roads were built for the use of the horse and carriage. The winter season, however, represented a challenge. The horse could be used on snow and ice, hauling a sledge instead of a carriage. The automobile could in many cases not be used unless the snow was

1. Silverstone et al. (1992), Sørensen (1996).

removed. As we see, the farmers' and the automobilists' needs where the roads were concerned were not the same. While the farmers could use the roads on a «status quo» basis, the winter roads and the automobiles had to be adapted to the needs of the car owners if more extensive use of the automobiles was to occur. How did the Norwegian road authorities, the producers of the cars and the users of the winter roads cope with this challenge?

In this paper I will analyse how both cars and motorcycles were interpreted, understood and shaped by local adaptations when the use of the vehicles during the winter season is concerned. I will first summarize some of the challenges the automobile pioneers met through the Norwegian Road Law of 1912. I will then analyse how local demands in some cases affected the development of both the automobiles and motorcycles. Finally I will describe how those vehicles were used during the winter period in Norway.

1.2 The Road law of 1912

As with several other European countries Norway did not have a general national law which regulated the use of the automobiles when the first cars came to the country. By the turn of the century most counties had accepted rules for the use of the automobiles. In Norway the county chief executive officer was to determine which cars and motorcycles could be used on the roads in the county. The county chief executive officers did not represent a homogenous group. Their attitude towards the new vehicles differed from county to county. Some were liberal, others forbade the automobiles. This created an almost impossible situation for the automobile owners. The first cars in Norway were largely bought by rich private pioneers from Kristiania. Neither the farmers nor the decision makers in many cases saw a future for the car on the country roads.

In 1912 the new road law was passed by the Norwegian Parliament (Stortinget). As a result the main roads in Norway linking the major cities and small towns were opened for the automobiles. Although this was an improvement, some main roads were still closed. If they regarded the interaction between the horse and carriage and the automobile as dangerous viewed in relation to the standard of the road, the local councils could close the roads for the automobiles. For local roads the situation was different. They were closed to automobiles unless the local councils took initiatives to open them. In most cases this was not the situation. As a result most Norwegian country roads were closed to automobiles up to 1920.

The farmers in most cases did not regard the automobiles as useful. On the farm they needed the horse and carriage. The horse could also be used on the roads, bringing the farmers to the nearest market, to church and to the doctor when needed. The production at the farms was, however, under change. Nor-

wegian agricultural production was not large enough to feed the growing population. Politicians in the Norwegian Parliament claimed that Norwegian agriculture had to change from subsistence economy to market economy. This wish demanded changes in the communication system as well. Up to 1910 the solution seemed lie in a development of the national railway system. After 1910 the use of the automobile was gradually regarded as the alternative.

The farmers in Norway were as a whole positive to the railroad. Trains were predictable in the sense the farmers knew when they arrived at the local stations. Because of that they could keep the most easily frightened horses away from the track when the trains came. In this respect the trains were «tamed» like the horse. When the first automobile routes were established around 1908 they were in many cases strictly scheduled like the railway. In some cases private cars had to drive off the automobile routes through the countryside, creating a very difficult situation for both the private car owners and the few tourists who came to Norway by car. The utilitarian value of the automobile was regarded as low as long as the automobiles could not replace the horse and wagon on the roads. This was, however, a very complex approach.

In general, use of the automobiles created strong opposition among the farmers. This opposition was complex and was characterized by both controversies and even sabotage from the main users of the roads, the farmers. This was, however, not restricted to Norway alone. Wolfgang Sachs analyses the integration of the automobile in Germany in his book *For Love of the Automobile*. Sachs argues that the period 1890–1914 can be described as «Pleasures for the Wealthy», where the integration of the automobile is concerned.² The cars were met with hostility and were looked upon as agents for a modernization the German farmers did not want. Uwe Fraunholz describes in his book *Motorphobia: Anti-automobiler Protest in Kaiserreich und Weimarer Republik* how the integration of new technology, the automobile, can be described as a complex social and cultural process. The controversies in many cases ended with violent attacks on both automobiles and the drivers, not unlike what was seen in England and USA.³ In Sweden Vendela Heurgren analyses in her study *När bilen drabbade landsbygden (When the car met the country side)*, how the integration of the automobile took place in Sweden.⁴ She points out that the conflicts can be described by different antagonisms: city-countryside, luxury-usefulness, modernity-tradition, industry-farming, young-old, upper-class versus working-class and men-women. I have found much of the same in my previous studies of the integration of the car in Norway, although not to the same extent as Fraunholz describes in Germany.⁵

2. Sachs (1992) side 3.

3. Fraunholz (2000), see also Flink (1970), Moline (1971).

4. Heurgren (1995).

The Norwegian country roads were built for the use of the horse and carriage. In summer the roads could be used by both horse and carriage, and automobiles. During the winter season farmers could use sledges on the snow and icy roads. The automobiles and motorcycles were in general not used during the winter season, although some enthusiastic pioneers also used their cars even if the roads were covered with snow. As long as the roads were closed, this restriction influenced the integration process of the automobiles.

An interesting point is that in many cases the earliest motorcycles were not regarded as automobiles. They were in many cases not registered unless they were used in the cities. Some cities had their own bicycle registration system, others did not bother. As a result it is very difficult to track the first motorcycles in Norway. We have, however, every reason to believe that the first motorcycles came to Norway at the same time as the first cars. It is also hard to find critical articles about motorcycles in the Norwegian newspapers. The bicycles were accepted and used by the farmers. Since the bicycle at this point was generally accepted, motorcycles were probably used in the countryside to a larger extent than the automobiles. They were smaller and cheaper than the automobiles and the narrow country roads were broad enough for both the motorcycle and the horse and carriage. Let us take a look at how the problems with snow-covered Norwegian country roads were solved.

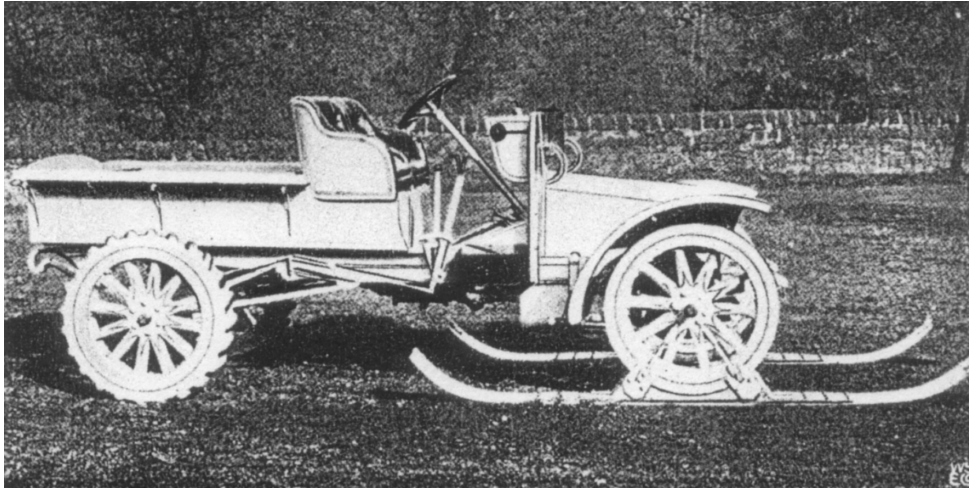
1.3 On snow and ice

In 1906 the German-American journalist Walter Wellmann prepared himself for reaching the North Pole using a gas-balloon. In case of accident he wanted to return by using motor sledges. The Norwegian newspaper *Lillehammer Tilskuer* wrote that it was Wellmann's intention to come to Norway and test one of the sledges on Lake Mjøsa. So far it is not known if the test rides were conducted.⁶

In 1907–1909 Ernest Henry Shackleton organized and led the "British Antarctic Expedition" to Antarctica. The primary goal was to reach the South Pole. The expedition was called the Nimrod Expedition after its ship, and also

-
5. *The Norwegian road director and his road engineers during the pioneer years of automobilism in Norway (1895-1910)*. Presentation at the First International Conference on the History of Transport, Traffic and Mobility (T2M). (Eindhoven 7th-9th November 2003), and *Tourists in horseless carriages, farmers in horse-drawn carriages? – Norwegian tourism, 1900-1915*. Presentation at the Second International Conference on the History of Transport, Traffic and Mobility (T2M). (Dearborn, USA 4th - 7th November 2004). Both on the CD from the conferences.
 6. *Lillehammer Tilskuer* May 5. 1906

the "Farthest South" expedition. On this trip they brought with them an Arrol-Johnstone automobile.



Shackleton's Arrol Johnstone equipped with skis. *Sport* Nr. 3, 1908)

It was equipped with a 12–15 hp engine with an air-cooler instead of a radiator filled with water. The rear wheels were replaced by wooden wheels with iron ribs to improve the grip on the ice and snow. The front end was equipped with skis.⁷ It proved useless. According to the press the converted automobile consumed too much gasoline and stopped all the time.⁸ Although this was an example of a technology which failed, the experiments did not stop here. Captain Robert Falcon Scott used motorized sledges on his second trip to Antarctica.

In 1901–04 Scott was the first person to explore Antarctica extensively by land. Scott led two expeditions. In 1910, he sailed on another scientific voyage. Scott planned to reach the Pole from Ross Island, using ponies and three motorised sledges, competing with Roald Amundsen. The use of the motorised sledges failed. So did Scott's attempt to return from the South Pole. As we know today, he died during this attempt in January 1912.

An interesting point is that one of the sledges was tested in Norway. In 1910 the sledge was tried out on Feforvannet (Lake Fefor) not far from Lillehammer in the Gudbrandsdalen valley. The sledge had four wheels which drove two bands equipped with spokes, one on each side of the sledge. It was driven by a gasoline engine developing 12 hp. During the test the sledge was improved by local workshops at Mesna Bruk in Lillehammer.⁹ Here both

7. The Norwegian *Sport* magazine Nr. 3, 1908

8. *Sport* Nr. 13, 1910

details were improved and the sledge was also repaired during the demanding test ride. The newspaper *Lillehammer Tilskuer* wrote that Mesna Bruk in 1909 delivered several products for Scott which he referred to as being useful. Thus we see local mechanics and engineers engaged in improving the new and foreign technology.



Scott's sledge being tested on the Fefor lake. (*Sport* Nr. 13, 1910)

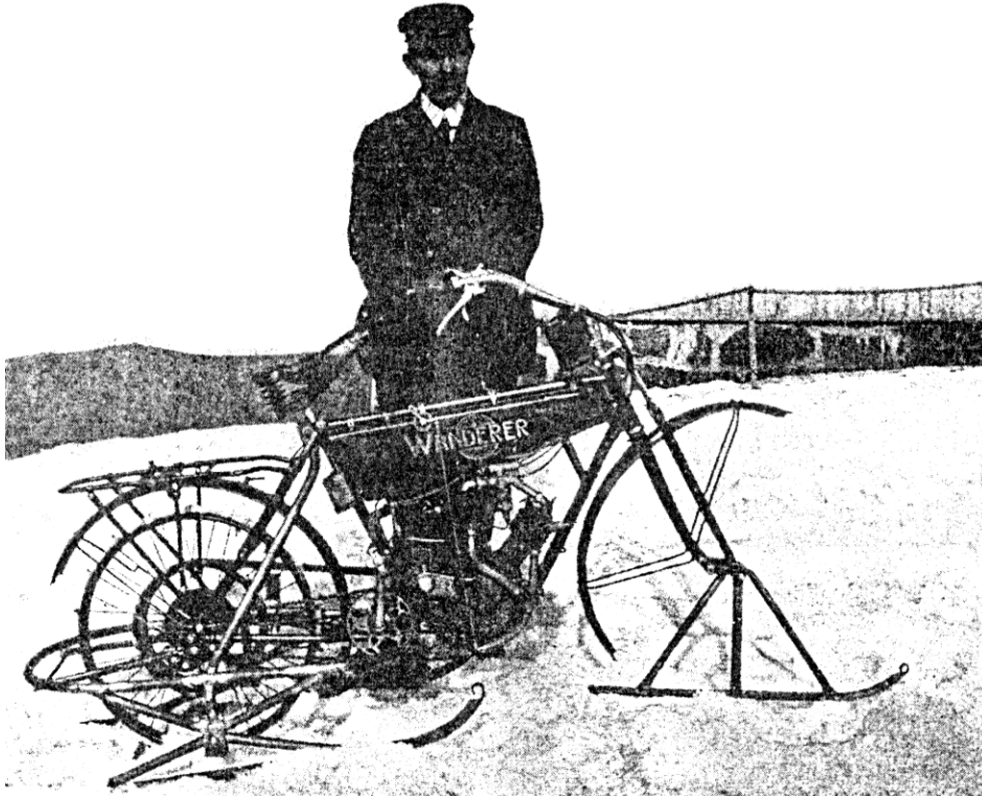
Neither of the sledges proved fit for the expedition. Still, both Shackleton's and Scott's attempt to use motorised vehicles on snow and ice were important to others, although not the only attempts to solve this problem. We shall now take a look at some more examples with a slightly different technology.

1.4 Motorcycles on snow and ice

In 1913 three mechanics at the P.T. Helleberg bicycle factory at Lillehammer developed a motorcycle which could be used during both the summer and the winter season. As we can see from the picture below, the wheels were removed. The front wheel was replaced by a ski. The rear wheel had small steel plates attached to its rim, not unlike Shackleton's solution. This «snow-motorcycle» was according to the Norwegian *Sport* magazine capable of reaching 30 km/h.¹⁰

9. *Lillehammer Tilskuer* (local newspaper) 21. March 1910

10. *Sport* Nr. 14, 1913



Picture from the Norwegian *Sport* magazine Nr 14, 1913, showing P.T. Hellebergs solution.

The *Sport* magazine argued that this was a better solution than what was used on Scott's sledges. It is rather daring to claim that this construction was influenced by Shackleton and Scott. It is, however, a fact that Scott's sledge was tested in Norway, not far from Lillehammer. The polar expeditions starting with Nansen and later continued by Amundsen were important for the young nation of Norway in many ways. Norway became in many respects a leading «polar» nation with a focus on both what the polar heroes achieved, but also on the technology they used. In any case, the production of the «snow» motorcycle is another good example that the new technology was adapted to local needs and that the «snow-scooters» of today had its local forerunners, both in the belt driven vehicles of Scott and this motorcycle.

Around 1915 a mechanic living in Stjørdal just north of Trondheim converted a motorcycle into a motor-sledge which he used during the winter. During the summer the motorcycle was used with its standard equipment. The engine, tank and the necessary equipment for making the motorcycle run were made by the Swiss firm Motosacoche. This kit made it possible to use a

bicycle-frame of local origin to build a motorcycle, another example of local adaptation. As we know, the earliest motorcycles were actually bicycles with engines put into the frames.



The driving wheel was equipped with spokes, creating a frightful experience for any passenger sitting on the luggage rack during use. The sign says: «Happy Christmas»... (Photo from my own collection).

The snow scooter of today was, however, not a Norwegian «invention». In both Canada and in USA motorcycles were adapted to meet the challenges their users had to face during the winter season. As long as only the horse and sleighs were used, the need for removing the snow was not a priority. Before the turn of the last century streets were in some cases not ploughed, they were rolled. The rollers packed the snow, and left a surface fit for horse drawn sleighs.



A snow roller in the city of Woodstock, Vermont (USA). (Tim Martin's collection)

As long as the motorized vehicles could be used on this packed surface the needs for belts or studded rims were probably less. Although interesting in cold weather, this solution was not applicable in the countryside over longer distances. Both in the States and in Canada local solutions to the snow problem can be seen.



Enlargement of a postcard released in USA showing two Harley Davidson motorcycles converted to use on ice and snow. The rear wheels have chains attached to the standard rubber tires. (Postcard of unknown origin).

I have not studied this phenomenon more extensively. The picture illustrates, however, that local adaptations took place and that the «snow scooter» was

not an «invention», but the result of a gradual development in countries where the snow-covered winter roads presented a problem.

1.5 Motorcycle or automobile?

As mentioned earlier, most Norwegian country roads were closed to automobiles during winter. Around 1920 the Norwegian road authorities conducted several experiments developing snow ploughs trying to deal with the problem, to which we shall return. Some Norwegian engineers tried out more radical solutions. One way of meeting this challenge was to physically adapt the automobiles for the winter roads. Let us take a look at one example.

The Øveraasen Company at the small town of Gjøvik developed several different snow ploughs, as we shall see later. However, they went further than that. They constructed a small «snowmobile» with sleigh runners to solve the problem with the snow-covered country roads.



The picture is taken on the lake Mjøsa around 1920. These two vehicles were produced by the Øveraasen Company at Gjøvik. The automobile to the left seems to be a prototype capable of carrying goods, while the one to the right probably is a finished example of this rather exotic technology.

A trained eye will see that the engine used on the automobile to the left is from a Harley Davidson motorcycle, making unclear boundaries between a motorcycle and a «car». The two vehicles can also be looked upon as forerunners of the ski-mounted motor scooters sold to-day. The two automobiles seem to be of the same construction. The power from the engine was transferred by using a large wheel equipped with small dippers gripping the ice and

snow. As we can see the automobile was made large enough to carry two persons. It was also narrow enough for a horse and sledge to pass without any serious problems.



The snowmobile tested on Lake Mjøsa, not far from Gjøvik (Picture from my own collection).



The automobile pictured in the centre of Gjøvik. The driving wheel at the rear of the automobile is clearly visible. (Picture from my own collection).

As for its use, it is hard to see that this vehicle could be useful on the country roads if the roads were covered by loose snow. In this case the driving

wheel equipped with small dippers would be inadequate to move the automobile forward. Both on an international and a national level attempts were made to solve this problem, probably based on the experiences from the polar expeditions we have mentioned earlier. Let us go back to the belt-technology.

1.6 The belt-driven vehicles

Due to snow and severe wind most roads were closed for the automobiles during the winter. A challenging problem for the development of the automobile traffic in Norway, especially for the automobile routes, was to overcome the difficulties when driving in the winter season. Since only a few farmers had automobiles this was a problem which had to be solved by the automobile routes in cooperation with the road authorities. As we shall see several different solutions were attempted.

«During the last years considerable time and effort have been spent on constructing equipment making the automobiles fit for use during the winter. Although several different possible solutions have been tested, so far the different systems have shown defects and flaws for everyday use. A belt-driven automobile has now been bought by the state and will probably be ready in January».¹¹

As we can see, both the authorities and local and foreign manufacturers engaged themselves in the development of the automobiles for winter use.

In France Citroën developed a system based on Adolphe Kégresse's system.¹² The name came from the system's inventor, Adolphe Kégresse, who designed a prototype while working for Tsar Nicholas II of Russia between 1906 and 1916. He applied it to several cars in the royal garage including Rolls-Royce and Packard automobiles. The Russian army also fitted the system to a number of their Austin Armoured Cars.

After the Russian Revolution Kégresse returned to his native France where the system was used on Citroën cars between 1921 and 1937 for off-road and military vehicles. It was also tested and used in other European countries.¹³ The Citroën- Kégresse Hinstin Autochenille also came to Norway. Here it was used by one of the automobile companies on the scheduled automobile routes.

11. Meddelelser fra Veidirektøren 1924, Nr. 52, Norsk Næringslivs Trykkeri, Oslo

12. <http://www.citroen.mb.ca/citROeNeT/utilities/autochenille/autochenille.html>

13. CITROExpert Number 2, 2000



The Kégresse system used on a 1915 Packard 3-38 belonging to Czar Nicolas II (Picture from Detroit Public Library, Item number EB01c673)

Although the automobile routes and the lorries competed with the railroad, the authorities gradually realized that it was no longer a question of automobiles or railroads. In districts with small populations and a moderate amount of traffic automobiles were gradually regarded as an alternative to the expensive railroad system. The authorities subsidized the automobile routes, among others the Gausdal Automobile Company. This opened for both testing of the Citroën-Kégresse and, as we shall see later, the development of the Norwegian snow ploughs. As we see the automobile routes were not regarded as private enterprises but were seen as a part of the «official» Norwegian communication system..



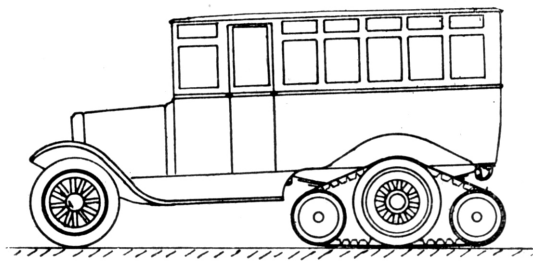
This Citroën with its Norwegian registration plate E-29 was owned by Gausdal Automobil Company. The car was used on the automobile route from Faaberg to Gausdal in the Gudbrandsdalen valley. (Meddelelser fra Veidirektøren Nr.52, 1924.)

The Citroën was equipped with a small trailer, making it possible to carry both people and goods. As we can understand, a trip with this vehicle had to be a cold one. There is no evidence pointing in the direction that the use of the Citroën- Kégresse was adapted by more than this automobile company in Norway. Still, the experiment was interesting. It was an important part of a more thorough attempt to convert the automobile to the Norwegian winter roads.

1.7 Winter-driving in Sweden

In the spring of 1923 the Swedish Postal Services (Sveriges allmänna postväsen) tested a Swedish Scania Vabis equipped with an endless canvas belt driven by a set of twin Goodrich semi pneumatic tires. This solution was developed by the Swedish engineer Nyberg.¹⁴

One of the Norwegian road engineers, A. Stampe, went to Sweden to see the system in use. Through the Road Law of 1912 the Norwegian road engineers were given a more important role where the use of the roads was concerned. They were in charge of the road building projects and were to determine which cars were to be given access to the roads. They were also important decision makers where new technology for road maintenance and snow removal were concerned. The road sector was both modernized and professionalized after 1912. In this context the use of modern technology was regarded as important.

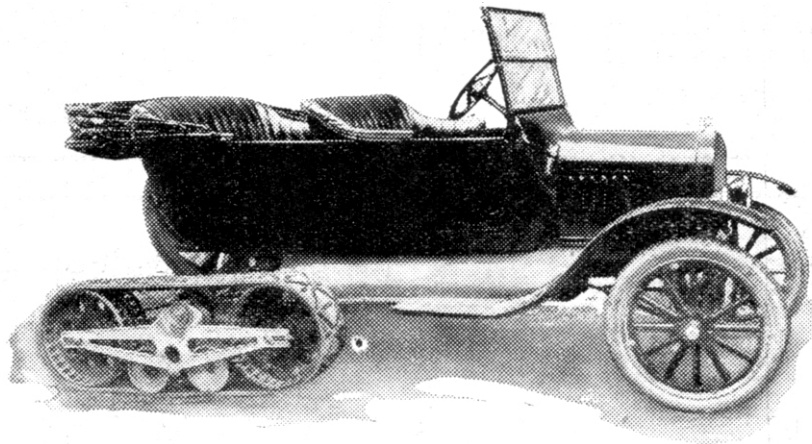


Drawing of the Scandia Vabis mentioned in the text.. (Meddelelser fra Veidirektøren Nr.49, 1924.)

According to Stampe this large automobile met severe problems both with the snow and its technical solutions. Stampe concluded that this system was

14. Meddelelser fra Veidirektøren Nr. 49, 1924, Norsk Næringslivs Trykkeri, Oslo

neither as good as the Citroën- Kégresse nor a system developed by the Norwegian engineer Car Bendtsen (Oslo).



Engineer Bendtsen used a Ford T and mounted the belt drive on the rear axle. (Meddelelser fra Veidirektøren Nr. 7, 1925.)

As we see Bendtsen's belt drive was used on a Ford T. I have so far not come across information pointing in the direction that this belt drive was tested on larger vehicles. The system might prove useful for doctors and vets, but not for the automobile routes. An important point is that local engineers both in Sweden and in Norway experimented with the new technology. They tried to find solutions suited to local needs.



As we see the front wheels were equipped with skis on the front axle making it possible for use in snow and on ice.(Meddelelser fra Veidirektøren Nr. 7, 1925.)

Although the Citroën- Kégresse probably inspired both Nyberg and Bendtsen, the development of the belt-driven vehicles was continued on a local basis both in Norway and in Sweden. The automobiles were «tamed» according to local needs. The belt-driven automobiles were not, however, the solution to the challenges of the winter roads. The automobiles with belts were in many respects solely «winter-automobiles» as much as the automobiles in general were «summer-automobiles».

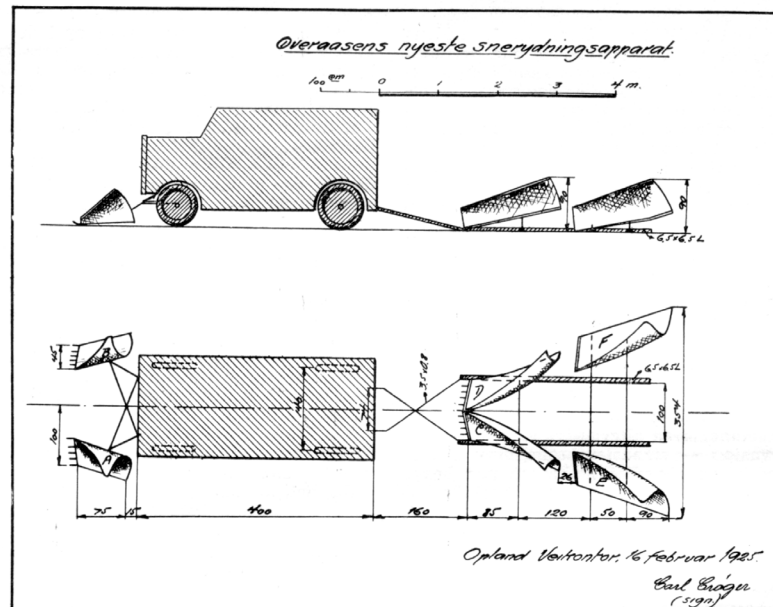
The system of a belt-drive on larger vehicles was seen on the tanks during WW1 and played a major part during WW2. It is still very important for use in the army. The system represented, however, a side-track where the use on the Norwegian winter roads is concerned. Here the solution was found in improving the standard of the roads and using snow ploughs on lorries and buses instead. We shall now finally take a closer look at that.

1.8 The snow ploughs

The belt-driven automobiles represented, as mentioned earlier, one of several possible solutions coping with the winter roads. As long as belt-driven automobiles were produced mainly for the winter season, this did not represent a permanent solution where the traffic on the winter roads was concerned. Another possible solution was to develop more efficient equipment for removing the snow and ice from the roads. If it were difficult to adapt the automobiles to the winter roads, the roads had to be adapted to the use of the automobile. This was, however, both expensive and in most cases demanded a change in the rather hostile attitude towards the automobiles from the farmers' side. Although the development of the horse-driven snow-ploughs traditionally used by the farmers is interesting, we shall now focus on the snow ploughs for cars.

The automobiles on the automobile routes were in most cases standard production automobiles which as a whole demanded open winter roads. We have seen that the Øveraasen Company at Gjøvik developed a small automobile fit for use both on ice and snow. They also developed snow ploughs which could be used both on lorries and on the large seven passenger cars. In spite the fact that the lorries were seen more and more often during the early 1920s, the seven passenger automobiles were extensively used on the automobile routes. The Norwegian Road Directorate conducted tests where snow ploughs were tried out on the modest Norwegian country roads. The problem with the frightened horses was still visible although most farmers looked upon the automobile routes with less scepticism than they had a few years ear-

lier. «The plough was painted gray not to frighten the horses, but was almost red after the testing due to the rust prevention lead priming.»¹⁵

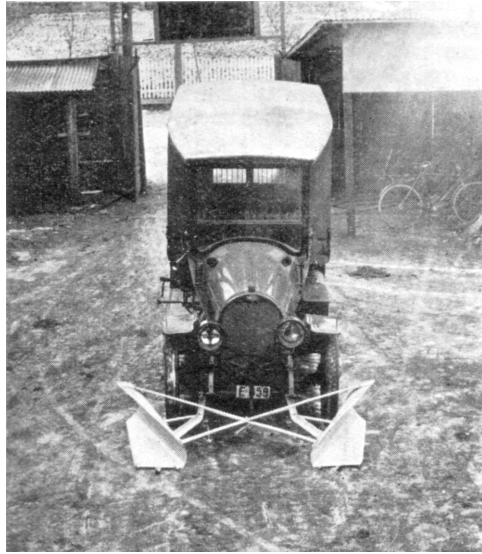


«Øveraasens latest snow removing apparatus». As we see this was a heavy and complicated system for removing snow. (Meddelelser fra Veidirektøren Nr. 3, 1925.)

The ploughs from the Øveraasen Company were tested on a Paige automobile used for distributing the mail. It was also tested on a Cadillac and a Hudson. The American automobiles had large and strong engines making it possible to drive at a greater speed than the European cars which seemed to dominate the Norwegian market earlier. In spite of the promising test results, the focus was gradually changed and larger snow ploughs were made for the stronger and heavier lorries. The fact that the Norwegian road authorities and the local producers engaged themselves in the new technology shows that the winter use of the roads was regarded as important for communication in Norway. The focus was to keep the roads open for what we can call «public» transport: the automobile routes, the distribution of the mail and lorries carrying goods from the major railroad lines into the countryside. In spite of the general opposition on the farmer's side, this traffic was regarded as «useful» for most farmers. It was also important for the private automobile owners, although this was not an important issue when the Norwegian road authorities

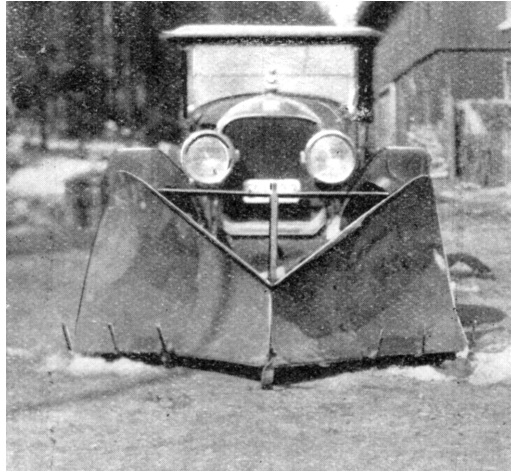
15. Meddelelser fra Veidirektøren Nr. 3, 1925, Norsk Næringslivs Trykkeri, Oslo

engaged themselves in the development of snow ploughs. Another important point is that the farmers had to maintain the country roads themselves..



The plough mounted on a Paige automobil used in the postal services. The rear plough is not visible. (Meddelelser fra Veidirektøren Nr.7, 1925.)

Although the removal of snow and ice brought some income to the farm, the work was both hard and often had to be done during the night or early in the morning. When the automobile companies started to clear the roads of snow some farmers waited until the automobiles with the ploughs had passed and then did the rest of the work by hand or horse-driven ploughs. The farmers' equipment proved both out of date and was not suited to coping with the needs of the automobile companies. The improved road clearing technology gradually led to a modernization of the maintenance of the winter roads. The cleared country roads were of great importance to the automobile companies, making the routes more profitable due to a longer season. In spite the gradual change from smaller to larger automobiles, quite a few seven passenger cars were used with the Norwegian ploughs. The cleared winter roads became «door openers» for more extensive traffic on the country roads. The automobiles did not only gradually replace the horse and wagon in the conveyance system. They also replaced the horse and the horse-drawn snow-ploughs along the winter country roads. An interesting point, although a bit odd, is that the motor-driven ploughs were capable of spreading the horse dung from the centre of the road to the banks. When spring came the sun melted the banks making the road free from ice and snow earlier than before.



The improved frontal plough used on an American Flint automobile. (Meddelelser fra Veidirektøren Nr.8, 1926.)

The ploughs were gradually developed for frontal use. Through extensive testing in December 1925 and April 1926 the ploughs were modified for use on passenger cars in the automobile routes. When weather conditions were tough the plough could not compete with the Citroën mentioned earlier, but since this vehicle was more expensive, the conclusion was that in the long run the Øveraasen equipment was to be preferred. In the long run the use of the ploughs led to changes along the country roads. Both the guard stones and the long line of telegraph posts had to be removed to open up for the use of the ploughs. The use and the acceptance of the ploughs in many ways represented a start of a new era. Both winter and summer roads were gradually opened for a more extensive use of the automobile in Norway. The rather harsh attitude towards the automobiles gradually changed. When second hand cars came on the market a growing number of farmers bought their own cars. The private automobiles were gradually regarded as useful which seemed to have been an important factor in the integration process of the automobile in Norway.

«The belt-driven period» on the Norwegian country roads was in many respects over. In the future more heavy equipment was developed, tested and used. Up to 1925 the snow ploughs, as we have seen, were manufactured according to local demands and the cars used in the automobile routes. As a rule, American 7-passenger cars were used. In many respects these automobiles were the largest cars the modest Norwegian country roads could accept.

1.9 Conclusion

Utility versus luxury was one of several important issues when the first automobiles came to Norway. The Norwegian countryside was in many respects dependant on the use of the horse and carriage. As long as the automobiles could not be used during the winter season, most farmers saw no future in the automobiles. Parallel to the general integration process of the automobile we see a growing effort to convert the automobile for winter use and later to adapt the winter roads to the use of the automobile. The attempts to create what we can call a «winter automobile» did not turn out to be successful.

We have seen that both motorcycles and light cars were adapted or designed for use on winter roads. The motorcycles could be used during winter by using a studded wheel instead of the normal rubber tire on the driving wheel. Although a side issue, this was in many respects the snow-scooters forerunners. They were developed locally in several countries and were adapted to local needs. They were what we can call «domesticated».

The final solution to the snow problem in Norway came with the snow ploughs. This was also important for the «automobilization» of Norway. As long as the automobiles could only be used during summer, they were rightly looked upon as «toys for the rich» and hardly as an alternative to the horse and carriage/sledge. The situation changed when the first automobile routes came. When the automobiles could be used year round, it was looked upon as «useful» for a growing number of interested groups in the Norwegian society. It gradually played a more important part of land communications in Norway. «The car society» was, however, well into the future. A general use of the private automobile was not seen in Norway before 1960 when the import restrictions from the 1930s were removed.

1.10 References

- Flink, James J. (1970): *America Adopts the Automobile, 1895–1910* Cambridge, Massachusetts, and London, England, The MIT Press.
- Fraunholz, Uwe (2000): *Motorphobia– Anti-automobiler Protes im Kaiserreich und Weimarer Republik*, Berlin: Vandenhoeck & Ruprecht.
- Heurgren, Vendela (1995): *När bilen drabbade landsbygden– Om den svenska landsbygdens motstånd och inkorporering av bilen under 1900-talets första decennier*, Stockholm :Nordiska Museet.
- Moline, Norman T (1971): *Mobility and the small town*, Chicago: The University of Chicago.
- Sachs, Wolfgang (1992): *For Love of the Automobile*, Berkeley Los Angeles: University of California Press.

- Silverstone, Roger, E. Hirsch and D. Morley (1992): Information and communication technologies and the moral economy of the household, in R. Silverstone and E. Hirsch (eds,) *Consuming technologies, media and information in domestic spaces*. Routledge, London.
- Sørensen, Knut H (1996): *Learning Technology, Constructing Culture*, Trondheim: NTNU, *STS-working paper no. 18*, 1996.

