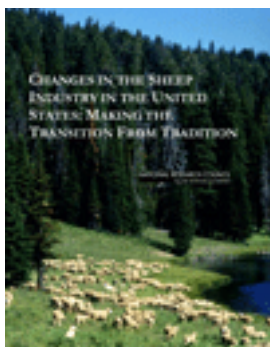


Free Executive Summary

Changes in the Sheep Industry in the United States: Making the Transition from Tradition



Committee on the Economic Development and Current Status of the Sheep Industry in the United States,
National Research Council

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The U.S. sheep industry is complex, multifaceted, and rooted in history and tradition. The dominant feature of sheep production in the United States, and, thus, the focus of much producer and policy concern, has been the steady decline in sheep and lamb inventories since the mid-1940s. Although often described as “an industry in decline,” this report concludes that a better description of the current U.S. sheep industry is “an industry in transition.”

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Summary

The U.S. sheep industry is complex, multifaceted, and rooted in history and tradition. The fortunes of each element of the industry are inextricably linked to the others and depend particularly on the economic health and prosperity of the sheep production enterprise.

The dominant feature of sheep production in the United States, and, thus, the focus of much producer and policy concern, has been the steady decline in sheep and lamb inventories since the mid-1940s. From a record high of 56 million head in 1942, inventories on January 1, 2007, declined to 6.2 million head, the lowest level in recorded history. No one factor, event, or policy change is responsible for the contraction of the industry but rather a confluence of forces against which U.S. sheep producers have had to struggle. Although producers have little control over many of the forces for change in the industry, such as globalization and the growing competition from other meat and fiber industries in the United States and abroad, the prosperity of the industry is not entirely dependent on external forces. The various components of the sheep industry have made adjustments, invested in new technologies, and improved efficiency. These changes are transforming the industry toward a more efficient and competitive future. Signs of the transition include the recent slowing of the long-term decline in inventories in many range sheep states and the modest growth in many farm flock states. Other signs of the industry's transition are the introduction of hair sheep, the growth in direct marketing, and the emergence of the dairy sheep industry. Although often described as "an industry in decline," this report concludes that a better description of the current U.S. sheep industry is "an industry in transition."

THE COMMITTEE'S TASK

The charge to the committee (see Appendix A) was to review the development and current status of the sheep industry in the United States and to examine challenges and opportunities for the future. The study was to examine factors that have led to the current status (e.g., regulation, product pricing, and international trade) and discuss the various challenges the

industry faces (e.g., disease, predation, genetic resources, land stewardship, and international trade and exchange rates). All sectors of the industry were to be examined, including meat, wool, live animals, pelts, milk, byproducts, and supporting businesses.

The study was in response to a congressional request to the National Academies in the Agricultural Appropriations Bill (P.L. 109-97) and was supported by funds received from the Economic Research Service of the U.S. Department of Agriculture. To prepare its report, the committee reviewed previous studies and scientific publications on the sheep industry, examined historical and current statistical data, conducted statistical analyses, held in-person interviews with representatives of key segments of the industry (both traditional and emerging), and conducted a survey of wool experts.

KEY FINDINGS

Although specific events, such as the end of World War II and the repeal of the National Wool Act, are often given as the cause of the decline of the industry, in fact many events and issues have contributed. Some of the more often cited factors are:

- Labor loss during World War II;
- A negative American G.I. experience with mutton during World War II;
- Changes in regulations and permits for grazing on public lands and endangered species regulations;
- Competition from other meats and other fibers;
- Changes in consumer preferences;
- Predation losses;
- Loss of the National Wool Act and the Incentive Payment programs;
- Foreign wool production subsidies;
- Competition from imports along with an appreciation of the U.S. dollar against Australian and New Zealand currencies in the 1990s; and
- Concentration in the U.S. packing and feeding industries.

Despite the continuing decline in the U.S. sheep industry, there are reasons for optimism about the future. Developments have occurred that have made the sheep industry more profitable for some. These developments include the following:

- Improvements in production efficiency;
- Leaner lamb;
- Development of further processing of lamb and new packaging techniques;
- Decline in Australian and New Zealand sheep numbers;
- Depreciation of the U.S. dollar; and
- Emergence of new and niche markets.

Development and Structure of the U.S. Sheep Industry

Most commercial sheep production in the United States consists of two types of operations. Range sheep operations are mostly in the western states and consist of relatively large flocks that graze native and unimproved pastureland. Farm flock operations, are mostly found in the Midwest and East. Flocks are smaller than those in range operations and are raised on improved pastures and in feedlots. Each system accounts for approximately 50 percent of the U.S. lamb crop.

Lambs from these two systems are marketed via one of three distinct channels, which are described in Chapter 1: (1) traditional, (2) early harvest, and (3) direct marketing. Official

government data capture information about the traditional channel but provide incomplete data about the other two channels. As a consequence, it is difficult to obtain reliable information on these two industry channels. Anecdotal indications are that both channels are active and growing in size.

Other products of sheep production include wool, pelts, and milk. Wool production, once the mainstay of the industry, has declined even more than lamb production. Much of the current U.S. wool production is exported to countries with expanding textile industries, such as China and India. Sheep pelts enter industrial markets and are either used for various consumer products or are exported, primarily to Asia and Europe. There is also a small but growing dairy sheep industry in the United States.

The U.S. Live Sheep Industry

Although the sheep industry has been in decline since at least World War II, an analysis in Chapter 2 of this report indicates that the decline in sheep numbers has slowed significantly and even reversed in some regions of the country, especially since 2000. While inventories in some states continue to erode, those in many other states have now halted their long-term decline and show modest growth in aggregate terms. Even in states with declining inventory, the rates of decline have been slower in recent years than a decade ago.

One contributor to this transition has been the increase in hair sheep and goats. To some extent, hair sheep and meat goats have been substituted for wool-producing sheep breeds and mohair goats. Hair sheep are easier to care for, more adaptable to humid climates, and eliminate the need for shearing.

The survival of the U.S. sheep industry depends on the potential for profitability which is affected by various economic factors, such as scale of operation, production efficiency, and labor and feed costs. The profitability and viability of the industry, however, is also dependent on the potential for continued scientific advances to improve profitability in various areas, including sheep breeding and genetics (e.g., the introduction of new breeds and mapping the sheep genome), improvements in reproductive efficiency, and improvements in nutrition. Also important is the sheep-environment interface, including sheep grazing behavior, interactions with wildlife (especially bighorn sheep), and the management of predators.

Commercial success in feeding lambs depends on numerous factors, some of which are beyond the control of the producer. A recent example is the increase in corn price because of the growth of the ethanol industry. New technologies and more efficient management practices are showing promise in terms of enhanced production and efficiency and cost reduction.

The process by which live sheep prices are negotiated and determined has been an important issue in the commercial sheep production industry in recent years. Like other livestock industries, the major issues related to pricing are the market dominance of retailers, keen competition from other livestock meats, and concentration in feeding and packing. Unique features relating to live sheep pricing are the relatively low demand at the consumer end of the market, the relative importance of ethnic markets, the loss of a large portion of consumer demand to imports, and large losses to predators. According to a recent report, most slaughter lambs are now being priced using formulas or are packer fed. Thus, rather than being driven by live markets, the lamb price discovery process now largely reflects carcass or cut-out values so that price is determined by negotiation or formula related to carcass quality. As a result, a significant amount of the risk is shifted from the buyer to the seller, especially for pricing based on quality. Mandatory price reporting, fully implemented in 2001, has resulted in more price reporting for live lambs and lamb meat and made the process of price discovery more transparent to all participants.

Productivity increases have been achieved through genetic progress and improved nutrition, health, and management practices that have increased both the number of lambs weaned per ewe and the harvest weight of lambs. The use of sheep and goats for vegetation

management—from targeted or prescribed grazing to the control of invasive and non-native weed, grass and small shrub species and similar practices to protect ecologically sensitive areas and residential areas near the urban/wildlands interface—has also increased widely. Sheep breeding and genetic improvements have resulted in new breeds that perform at higher levels.

Key opportunities for enhanced industry efficiency and competitiveness include:

- Continued improvements in productivity through further advances in genetics (including gene biotechnology), nutrition, health, and management programs;
- Forage finishing to enhance lamb's competitive position relative to other red meats as the cost of grains and concentrate feeds continue to rise; and
- Direct marketing of high-quality, lighter-weight lambs to emerging and rapidly expanding ethnic markets.

Challenges to sustainable growth and economic competitiveness include:

- The sheep industry infrastructure suffers the consequences of decades of decline in volume;
- Increasing predation problems in wildlife populations in many states indicate the need for sheep industry alliances to work closely with wildlife agencies and interest groups and with those involved with threatened and endangered species management programs;
- Problems in pricing and price determination continue to plague the industry;
- The sheep industry continues to lag behind other livestock industries in the adoption of genetic improvement technology resulting in a competitive disadvantage of sheep with respect to other livestock species; and
- The share of public and private support for new technology development and educational activities received by the sheep industry continues to decline relative to other livestock sectors.

Sheep Health Issues

Diseases reduce sheep viability, overall growth, rate of gain, immunity, and reproductive performance, which together reduce production efficiency and income. There are few data, however, on the economic impacts or the true prevalence of most of the disease conditions affecting sheep in the United States. This lack of information makes it difficult to make decisions about the allocation of resources and to determine research and policy priorities.

Most producers do not implement any type of quarantine, require premovement testing, or take precautions to prevent nose-to-nose contact at shows. The industry has the opportunity to improve biosecurity practices that will help to reduce the spread of endemic diseases and prevent the entry of highly contagious diseases.

According to national surveys, more producers have identified stomach/intestinal parasites (worms) as a great or moderate concern than any other disease condition. Although not usually fatal, these internal parasites cause substantial economic losses. In addition, the intestinal parasites have begun to develop resistance to the anthelmintic drugs used to treat them. In the United States, there is a shortage of approved animal drugs intended for less common animal species (minor species). The limited availability of effective anthelmintics is an example of this shortage. Other diseases that have the potential to have a significant economic impact on the U.S. sheep industry include Johnes disease, foot rot, and any foreign animal disease such as foot and mouth disease.

Scrapie is an insidious, degenerative disease that affects the central nervous system of sheep. Although scrapie is relatively rare in the United States (< 0.2 percent of animals are

affected), it is always fatal. In addition, there is some concern of public health risk, although there is no current evidence as such. An outbreak of scrapie may also impede or restrict U.S. sheep exports. As a consequence, the United States has had a National Scrapie Eradication Program in place since 1952. Over the last 5 years, there has been substantial progress in the effort to eliminate scrapie from the United States.

Important accomplishments in sheep health include reducing the percentage of sheep that test positive for scrapie at slaughter (fewer new infected and source flocks and fewer animals indemnified) and a more complete animal identification system than exists for any other livestock species in the United States.

Opportunities for minimizing the economic impacts of diseases include:

- The use of the identification system to monitor animal movement as the foundation for an overall flock health program; and
- An improvement in biosecurity practices to help reduce the spread of endemic diseases and prevent the entry of highly contagious diseases.

Challenges remain however and include:

- Lack of data on the economic impact or the true prevalence of most sheep diseases;
- Unavailability of many critically needed drugs; and
- A shortage of large-animal veterinarians in many areas of the country.

The U.S. Lamb Industry

Sheep producers sell their lambs to a relatively small number of relatively large commercial feeders. As a consequence, commercial feeders have some potential market power relative to producers. Feeders sell to an even smaller number of packers. Feeders usually have few alternative buyers giving them little bargaining power in dealing with packers. However, packers are at a distinct disadvantage in bargaining on price with large retailers and large foodservice buyers. Finally, food retailers sell to a large number of consumers. This market structure makes it difficult for value preferences to migrate from consumers to producers. Congress has attempted to address this issue in two recent pieces of legislation: (1) the Livestock Mandatory Reporting Act in 1999 and (2) the Lamb Promotion, Research, and Information Order (American Lamb Checkoff Program) in 1996. Research has indicated that price changes at the producer/feeder level are almost fully transmitted to the wholesale level but not from the wholesale level to the retail level. Although there has been concern that the decreased numbers of packers (the four largest slaughtering firms accounted for almost 70 percent of the federally inspected lamb slaughter in 2005) have affected price spreads or margins, studies to date have provided limited evidence that packer concentration exerts a significant negative effect on slaughter prices.

Lamb is a relatively minor product in most food stores, occupying only 1 to 3 percent of meat cases. However, the proportion of meat cases that contain lamb has increased and now exceeds 80 percent. Some increased penetration of lamb in retail meat cases is good news for the lamb industry, in addition to the growing custom and ethnic specialty markets not captured in surveys. Buoyed by growing lamb imports, U.S. lamb consumption has grown slowly during the last decade leading to a relatively steady annual per capita consumption level of 0.50 to 0.55 kg since the mid-1990s.

Excess fat on lamb carcasses has been a persistent problem for the sheep industry. The current market structure and pricing system generally rewards producers and lamb feeders for

weight rather than value based on quality and yield grades. The evolution of a yield grade system coupled with carcass merit pricing has helped to improve this situation. Numerous modern tools to assess the yield of boneless closely trimmed retail cuts are available but have not been widely adopted by the industry because of cost and the potential to slow the rates of slaughter and processing. Although food-borne illnesses have not affected the lamb industry in the same way as they have other meat industries, lamb packers and processors have implemented multiple screening systems to minimize pathogens. Efforts such as development of controlled atmospheric packaging and products that are easy and quick to prepare have also been made to enhance the value of lamb products. Lamb has a more distinct flavor than most competing meats. Recent research studies have investigated the source of these sensory properties.

Increasing the demand for lamb is key to the growth and expansion of the industry. The traditional argument that American tastes and preferences have moved away from lamb may no longer be applicable given the steady level of consumption in recent years despite declining production. More appropriate now may be the argument, borne out by recent research, that lamb is purchased fairly consistently by a small group of consumers and not at all by most consumers. Efforts to promote lamb consumption in recent years by the American Lamb Board have been shown to be effective. Competition from imports is an important concern for the U.S. lamb industry. Between 1990 and 2005, imports increased from approximately 18 million to 82 million kilograms. By 2005, imports made up almost half of domestic consumption. Competitive advantage in global lamb markets is influenced by many factors, such as costs of production, industry infrastructure, and currency exchange rates. The U.S. sheep industry has some advantage in producing sheep in terms of a natural resource base and a strong cadre of supporting industries. Competing successfully with Australia and New Zealand may require the U.S. lamb industry to focus on differentiating American lamb from imported lamb.

The hanging carcass represents only about half the live weight of a lamb. Thus, byproduct markets are an important part of the lamb industry. Major byproducts (in addition to wool) include various edible portions of the carcass, rendered byproducts, pelts, and lanolin. Additional uses that have developed recently include pharmaceutical, research, and waste management applications. Margins in the lamb packing industry are thin so that the profit is often in the sale of the byproducts.

The functioning of lamb markets is affected by a wide range of policies and regulations designed to regulate the business practices of those who engage in the buying and selling of lamb, including meat inspection laws, the Packers and Stockyards Act, and mandatory price reporting. The USDA Livestock Risk Protection-Lamb Insurance Policy program is a new price risk management tool that provides producers and feeders of lambs with the opportunity to insure lambs they own against unexpected price declines.

The U.S. lamb industry has opportunities for growth, development, and enhanced competitiveness.

- Depreciation of the U.S. dollar has enhanced the competitiveness of domestic lamb against imports;
- The use of alternative marketing arrangements, such as forward contracts or marketing agreements, as opposed to the use of cash transactions, is also helping the industry to compete more effectively with imports;
- Promotion efforts have been shown to enhance lamb demand; and
- Along with a growing presence of lamb in the food service sector, new markets for lamb products are emerging.

Realizing the opportunities, however, will require the industry to tackle a number of difficult challenges.

- Continued enhancements of production efficiency and reductions in cost will be needed;

- The development of an automated system to assess accurately and uniformly carcass value across processors and over time;
- Lack of data, such as a retail lamb price series, lamb consumption by country of origin, away-from-home vs. at-home consumption of lamb, socioeconomic profiles of consumers in different market areas; and
- Research on the retail demand for specific cuts of lamb is needed to assist retailers and food service purveyors in pricing and price-based promotion of lamb cuts.

The U.S. Wool Industry

At one time, wool was considered the primary product of sheep production, with lamb and mutton as byproducts. Today, the situation is reversed. Wool is sometimes even considered a “liability” in sheep production. The growth of hair sheep production is a reflection of the decline in the relative profitability of wool production vs. lamb production. Wool currently accounts for 10 to 30 percent of sheep production income in range production systems and < 5 percent in intensive farm flock production systems.

Wool producers use one of three primary market preparation methods at shearing (original bag, bellies out and the fleeces not tied individually, and table skirted and classed), and one of four primary sales mechanisms (wool warehouses, wool cooperatives, wool pools, and private treaties). Most U.S. wool is sold as original bag even though the table skirted and classed method is recommended for international and premium domestic wool markets. The value of wool is influenced by several objective measurements (e.g., fiber diameter, yield, staple length, and vegetable matter) as well as several subjective measurements (e.g., color or stains, condition of staple tips, crimp, and style or handle).

A number of natural fibers (e.g., cotton, flax, and silk) and synthetic fibers (e.g., nylon, rayon, acrylic, and polyester) compete with wool. From 1995 to 2005, wool accounted for an average of only 0.6 percent of all fibers used by U.S. mills. Furthermore, the domestic mill use of all fibers, including wool, has been in a general downward trend reflecting the growing globalization of the textile industry. International trade treaties, such as the General Agreement on Tariffs and Trade, have fostered the decline of textile manufacturing in the United States.

The world wool market is dominated by China, which purchases almost 50 percent of the world market supply of raw wool and produces 39 percent of the world’s wool apparel products. More research on pricing and income elasticities for wool is critical to ensure an accurate understanding of the U.S. and world demand situation for wool. Demand analyses involving wool, cotton, and manufactured fiber are necessary both at the mill level and at the retail level. World wool market prices are primarily established by Australian supply and world demand. Australia produces approximately 50 percent of the world’s wool sold at auction. Prices for U.S. wool range from 60 to 75 percent of imported Australian wool prices. An important question for wool producers is whether price differences between Australian and U.S. wool are related to differences in the extent of preparation of wool for marketing. A hedonic price model was developed by the committee to test the hypothesis that skirting and classing wool generally produced higher prices compared to original bag wool. The results provide a basis for determining premiums or discounts relative to the current practice of marketing original bag wool. Clearly, producers who do minimal preparation of their wool before sale are losing substantial premiums paid for wool that has been more prepared for sale.

Wool production and marketing have been affected by several national and international policies and regulations. The most significant was the National Wool Act (in place from 1954 to 1994), which provided support to the domestic wool industry. Other significant legislation has included the Multi-Fiber Arrangement (1974), the Agreement on Textiles and Clothing (1995), the establishment of the American Wool Trust (2000), and the Farm Security and Rural Investment Act (2002). The United States is not the only wool-producing country that has provided price support for wool producers. Price support programs in Australia, New Zealand,

and South Africa set wool prices well above market levels in the 1980s and early 1990s, leading to growing wool stockpiles during that period. These stockpiles are now largely gone.

The U.S. wool industry has made some progress in responding to the pressures it has faced, including movement toward further preparation of wools by producers and public/private collaborative research to develop fabrics and garments that are machine washable, more breathable and less prickly when worn against the skin, shrink proof, and flame resistant.

A survey of key wool industry leaders identified several important opportunities currently facing the U.S. wool industry.

- Economic growth in China and other developing countries leading to potentially greater foreign demand for wool apparel goods and less import pressure on U.S. markets;
- Increased wool premiums through increased preparation of wool; and
- Growing markets for specialty wools for hand spinners, yarn for weavers; and knitters, and other wools such as naturally colored wools.

Survey respondents also identified ongoing challenges to the future growth and development of the U.S. wool industry.

- Fragmented selling systems, fewer domestic wool buyers, distance-to-market challenges for producers, greater concentration of the wool processing industry;
- A shortage of qualified sheep shearers;
- A need to continue the trend toward preparing wool to international standards;
- Contamination from hair sheep breeds; and
- A lack of financial support for critically needed research.

The U.S. Dairy Sheep Industry

Although currently a relatively small segment of the U.S. sheep industry, dairy sheep production is in the early stages of becoming an economically important agricultural industry. Sheep milk is generally produced in areas that are great distances from willing milk processors. The formation of marketing cooperatives and the practice of freezing milk in plastic bags in large commercial freezers on the farm are helping to resolve the distance issue.

The United States is the world's largest importer of sheep milk cheese, accounting for about half of world sheep milk cheese exports. A lack of local commercial processing factories has led many U.S. sheep producers to make cheese on their farms in small batches for direct marketing to individuals, food stores, and restaurants. Domestic sheep milk cheeses can also be found in many specialty cheese stores and even stores of national grocery chains.

The growth of the domestic industry is the result of the production of high-quality milk, the manufacture of high-quality cheeses, and the promotion of those cheeses by both national and state organizations.

Opportunities for the dairy sheep industry include:

- The increasing consumption of sheep milk cheese by U.S. consumers;
- The growing movement among consumers to eat locally raised and produced items; and
- Dairy sheep production represents an opportunity for small-scale farms because relatively little land is required and sheep are small enough to be handled safely by most family members.

Future growth of the industry could be limited by:

- The lack of either regional or national genetic improvement programs for dairy sheep traits in the United States;
- Limited research and extension support for dairy sheep production, sheep milk processing, or sheep milk product marketing;
- Limited marketing options; and
- Imports of lower-priced sheep milk cheeses.

Alternative and Emerging Markets

Although the full extent of the changes taking place in the industry is difficult to determine, sheep and lamb inventories indicate growth in eastern and mid-Atlantic states and in the Midwest, where alternative and emerging markets are particularly important. Much of the lamb moving to these emerging markets is sourced directly from farms or small abattoirs, especially during religious holidays, and is not inspected in federally or state regulated facilities or included in official USDA slaughter data. These alternative or “niche” markets represent a growth area for the industry. Although the East and West coasts are the largest U.S. markets for lamb, the consumption of lamb in those areas is skewed toward religious and ethnic groups and away from groups with origins in northern Europe. For some religious groups, lamb is consumed on a regular basis and has special significance for holidays or holy days.

Because there is relatively little information on the importance of the ethnic lamb market in the United States, an analysis of the effects of ethnic markets on aggregate U.S. lamb demand was conducted as a part of this study. The primary conclusions were that Muslim holiday periods and Christian and Orthodox Easter increase slaughter levels of lamb and yearlings significantly and that the impact of these holidays appears to be increasing with time. To the extent that some of this lamb is purchased directly from farms and not recorded in official tallies of slaughter, official data could underestimate the impact of these religious periods. Other ethnic markets of growing importance in some regions of the country include Hispanic, Italian, and Greek communities.

A number of other alternative markets for the sheep and lamb industry have emerged, especially during the last ten years. These product markets offer the opportunity for higher producer prices and profit through specialized, value-added products, such as organic lamb, specialty cheeses, fine wool, and other specialty products with perceived unique qualities. Many sheep producers are taking proactive approaches to sell their own products directly to customers and foodservice operators and bypass traditional marketing channels. Advances in communication systems, especially the Internet, have facilitated such direct marketing.

Some high-end restaurants and specialty meat retailers have begun buying whole carcasses or quality live animals for custom slaughter from producers who meet such conditions as sustainable production, “locally grown,” organic, and related characteristics relevant to their customers. They price cuts to meet the local demand and in a way that sells the entire carcass.

Opportunities in the nontraditional, emerging, and alternative markets include:

- The emerging ethnic and religious markets in the major U.S. metropolitan areas;
- Organic, natural, and locally produced lamb; and
- Specialty wools.

Challenges to the expansion of these alternative and emerging markets include:

- The limited information on these markets, the value chains, and product pathways make it difficult to determine market opportunity; and
- Regulatory systems, operated either by government or as industry-established standards, will be needed to support sustained growth.

CONCLUSIONS

Although continuing declines can be expected in some areas of the U.S. sheep industry, the changes currently taking place offer grounds for optimism. The emergence of new and alternative markets for sheep products signifies that the industry may be on the brink of a transition from traditional practices and marketing channels to new markets, new technologies, new products, and a new consumer base. This offers the potential to arrest the decline experienced over the last several decades. Expanding alternative and emerging markets will create considerable challenges to the industry and to policy makers. However, all these challenges can be addressed by a concerted effort from within the industry.

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Committee on the Economic Development and Current Status of the Sheep
Industry in the United States

Board on Agriculture and Natural Resources

Division on Earth and Life Studies

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