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Various fiber-based materials For other uses, see Textile (disambiguation). Jamdani weaving of Bangladesh Handmade floral patterns on textiles, The production of textiles which were initially artisanal work, has grown into a vast field today that includes the production of fibers, yarns, fabrics, and various fibrous products for different domestic and industrial usages. In textile production, longitudinal yarns are referred to as warp and are interlaced with weft or filing yarns to create a woven fabric. Weaving Weaving demonstration on an 1830 handloom in the weaving museum in Leiden Textile is an umbrella term that includes various fiber-based materials, including fibers, yarns, filaments, threads, different fabric types, etc. At first, the word "textiles" only referred to woven fabrics.[1][2][3] However, weaving is not the only manufacturing method, and many other methods were later developed to form textile structures based on their intended use. Knitting and non-woven are other popular types of fabric manufacturing.[4] In the contemporary world, textiles satisfy the material needs for versatile applications, from simple daily clothing to bulletproof jackets, spacesuits, and doctor's gowns.[3][5][4] Textiles are divided into two groups: consumer textiles for domestic purposes and technical textiles. In consumer textiles, aesthetics and comfort are the most important factors, while in technical textiles, functional properties are the priority.[4][6] The durability of textiles is an important property, with common cotton or blend garments (such as t-shirts) able to last twenty years or more with regular use and care. Geotextiles, industrial textiles, medical textiles, and many other areas are examples of technical textiles, whereas clothing and furnishings are examples of consumer textiles. Each component of a textile product, including fiber, yarn, fabric, processing, and finishing, affects the final product. Components may vary among various textile products as they are selected based on their fitness for purpose.[4][7][6] Fiber is the smallest fabric component; they are typically spun into yarn, and yarns are used to manufacture fabrics.[8][7] Fiber has a hair-like appearance and a higher length-to-width ratio. The sources of fibers may be natural, synthetic, or both. The techniques of felting and bonding directly transform fibers into fabric. In other cases, yarns are manipulated with different fabric manufacturing systems to produce various fabric constructions. The fibers are twisted or laid out to make a long, continuous strand of yarn.[9] Yarns are then used to make different kinds of fabric by weaving, knitting, crocheting, knotting, tatting, or braiding.[10][11][5] After manufacturing, textile materials are processed and finished to add value, such as aesthetics, physical characteristics, and increased usefulness.[12] The manufacturing of textiles is the oldest industrial art.[13] Dyeing, printing, and embroidery are all different decorative arts applied to textile materials.[14] The word 'textile' comes from the Latin adjective textilis, meaning 'woven', which itself stems from textus, the past participle of the verb texere, 'to weave'.[15] Originally applied to woven fabrics, the term "textiles" is now used to encompass a diverse range of materials, including fibers, yarns, and fabrics, as well as other related items.[9][16][3] "Fabric" redirects here. For other uses, see Fabric (disambiguation). A "fabric" is defined as any thin, flexible material made from yarn, directly from fibers, polymeric film, foam, or any combination of these techniques. Fabric has a broader application than cloth.[17][18] Fabric is synonymous with cloth, material, goods, or piece goods.[4][5] The word 'fabric' also derives from Latin, with roots in the Proto-Indo-European language. Stemming most recently from the Middle French fabrique, or "building," and earlier from the Latin fabrica ('workshop; an art, trade; a skillful production, structure, fabric'), the noun fabrica stems from the Latin faber" artisan who works in hard materials', which itself is derived from the Proto-Indo-European dhabh-, meaning 'to fit together'.[19] Cloth merchant's shop A replica draper's shop at the Museum of Lincolnshire Life, Lincoln, England Cloth is a flexible substance typically created through the processes of weaving, felting, or knitting using natural or synthetic materials.[20] The word 'cloth' derives from the Old English clað, meaning "a cloth, woven, or felted material to wrap around one's body', from the Proto-Germanic klaithaz, similar to the Old Frisian klath, the Middle Dutch cleet, the Middle High German kleit and the German kleid, all meaning 'garment'.[21] Although cloth is a type of fabric, not all fabrics can be classified as cloth due to differences in their manufacturing processes, physical properties, and intended uses. Materials that are woven, knitted, tufted, or knotted from yarns are referred to as cloth, while wallpaper, plastic upholstery products, carpets, and nonwoven materials are examples of fabrics.[17] Main article: History of clothing and textiles Textiles themselves are too fragile to survive across millennia; the tools used for spinning and weaving make up most of the prehistoric evidence for textile work. The earliest tool for spinning was the spindle, to which a whorl was eventually added. The weight of the whorl improved the thickness and twist of the spun thread. Later, the spinning wheel was invented. Historians are unsure where; some say China, others India.[22] The precursors of today's textiles include leaves, barks, fur pelts, and felted cloths.[23] The Banton Burial Cloth, the oldest existing example of warp ikat in Southeast Asia, is displayed at the National Museum of the Philippines. The cloth was most likely made by the native Asian people of northwest Romblon. The first clothes, worn at least 70,000 years ago and perhaps much earlier, were probably made of animal skins and helped protect early humans from the elements. At some point, people learned to weave plant fibers into textiles. The discovery of dyed flax fibers in a cave in the Republic of Georgia dated to 34,000 BCE suggests that textile-like materials were made as early as the Paleolithic era.[24][25] The speed and scale of textile production have been altered almost beyond recognition by industrialization and the introduction of modern manufacturing techniques.[26] Main article: textile industry The textile industry grew out of art and craft and was kept going by guilds. In the 18th and 19th centuries, during the Industrial Revolution, it became increasingly mechanized. In 1765, when a machine for spinning wool or cotton called the spinning jenny was invented in the United Kingdom, textile production became the first economic activity to be industrialised. In the 20th century, science and technology were driving forces.[27][28] The textile industry exhibits inherent dynamism, influenced by a multitude of transformative changes and innovations within the domain. Textile operations can experience ramifications arising from shifts in international trade policies, evolving fashion trends, evolving customer preferences, variations in production costs and methodologies, adherence to safety and environmental regulations, as well as advancements in research and development.[29] The textile and garment industries exert a significant impact on the economic systems of numerous countries engaged in textile production.[30] Sample of calico printed with a six-colour machine by Walter Crum & Co., from Frederick Crace Calvert, Dyeing and Calico Printing (1878) Most textiles were called by their base fibre generic names, their place of origin, or were put into groups based loosely on manufacturing techniques, characteristics, and designs.[31][32][33][34] Nylon, olefin, and acrylic are generic names for some of the more commonly used synthetic fibres.[35] Name Product Textiles named by Description Cashmere Wool fiber obtained from cashmere goats Origin Kashmir Cashmere is synonymous with the Kashmir shawl, with the term "cashmere" derived from an anglicisation of Kashmir.[36] Calico Plain weave textile material Origin Calicut The fabric originated in the southwestern Indian city of Calicut. Jaconet Lightweight cotton fabric in plain weave Origin Jagannath Puri Jaconet is anglicisation of Jagannath where it was originally produced.[37] Jersey A type of Knitted fabric Origin Jersey, Channel Islands Jersey fabric was produced first at Jersey, Channel Islands.[36] Kersey A coarse woolen cloth Origin Kersey, Suffolk The fabric is named after the town in the east of England.[36] Paisley (design) A type of motif Design Paisley, Renfrewshire A town situated in the west central Lowlands of Scotland.[36] Dosuti A handspun cotton cloth Characteristics A coarse and thick cotton cloth In and around the 19th century Punjab and Gujarat were famous for production of various handspun cloths. Dosuti was distinguished by the number of yarns (Do+Suti translates to 'two yarns') used to produce it. Eksuti was another variety using a single thread. [38][39] Mulmul types such as āb-i-ravān running water, Baft Hawa woven air[40] Fine muslin fabric variations from Dacca in Bengal Characteristics Delicate muslin types Dacca, in the eastern Indian subcontinent, produced a wide range of handwoven and spun muslins. Baft Hawa, which means "woven air", Shabnam, which means "evening dew", and ab-i-ravan, which means "flowing water" are some poetic names for soft muslins.[40][41] Nainsook A plain weave fabric with soft hand Characteristics Pleasing to the eyes Nain + Sook translates to "eye-pleasing".[37] Swanskin A woven flannel cloth Characteristics Appears and feels like swan skin A18th century fabric developed at Shaftesbury.[42] Tansukh Another type of Muslin with soft and delicate texture Characteristics Pleasing to the body Tan + Sukh translates to "body pleasing". Tansukh was a fine, soft, and delicate textured cloth. The cloth type is mentioned in the 16th century Mughal time records, Ain-i-Akbari.[43] The related words "fabric"[11] and "cloth"[20] and "material" are often used in textile assembly trades (such as tailoring and dressmaking) as synonyms for textile. However, there are subtle differences in these terms in specialized usage. Material is an extremely broad term basically meaning consisting of matter, and requires context to be useful. A textile is any material made of interlacing fibers, including carpeting and geotextiles, which may not necessarily be used in the production of further goods, such as clothing and upholstery. A fabric is a material made through weaving, knitting, spreading, felting, stitching, crocheting or bonding that may be used in the production of further products, such as clothing and upholstery, thus requiring a further step of the production. Cloth may also be used synonymously with fabric, but often specifically refers to a piece of fabric that has been processed or cut.[citation needed] Greige goods: Textiles that are raw and unfinished are referred to as greige goods. After manufacturing, the materials are processed and finished.[44][12] Piece goods: Piece goods were textile materials sold in cut pieces as specified by the buyer. Piece goods were either cut from a fabric roll or made to a specific length, also known as yard goods.[45][46] A baby wearing many items of soft winter clothing: headband, cap, fur-lined coat, scarf, and sweater Textiles are various materials made from fibers and yarns. The term "textile" was originally only used to refer to woven fabrics, but today it covers a broad range of subjects.[16] Textiles are classified at various levels, such as according to fiber origin (natural or synthetic), structure (woven, knitted, nonwoven), finish, etc.[31][32][33][34] However, there are primarily two types of textiles: Textiles have an assortment of uses, the most common of which are for clothing and for containers such as bags and baskets. In the household, textiles are used in carpeting, upholstered furnishings, window shades, towels, coverings for tables, beds, and other flat surfaces, and in art. Textiles are used in many traditional hand crafts such as sewing, quilting, and embroidery.[4] Technical textile is a branch of textile that focuses on the protection, safety and other functional performance attributes of textiles, unlike domestic textiles, where the primary focus is aesthetics and comfort., an EOD technician wearing a bomb suit Explosive ordnance disposal (EOD) suit. Nonwoven geotextile bags are much more robust than woven bags of the same thickness. Textiles produced for industrial purposes, and designed and chosen for technical characteristics beyond their appearance, are commonly referred to as technical textiles. Technical textiles include textile structures for automotive applications, medical textiles (such as implants), geotextile (reinforcement of embankments), agrotextiles (textiles for crop protection), protective clothing (such as clothing resistant to heat and radiation for fire fighter clothing, against molten metals for welders, stab protection, and bullet proof vests). In the workplace, textiles can be used in industrial and scientific processes such as filtering. Miscellaneous uses include flags, backpacks, tents, nets, cleaning rags, transportation devices such as balloons, kites, sails, and parachutes; textiles are also used to provide strengthening in composite materials such as fibreglass and industrial geotextiles.[4][6] Due to the often highly technical and legal requirements of these products, these textiles are typically tested to ensure they meet stringent performance requirements. Other forms of technical textiles may be produced to experiment with their scientific qualities and to explore the possible benefits they may have in the future. Threads coated with zinc oxide nanowires, when woven into fabric, have been shown capable of "self-powering nanosystems", using vibrations created by everyday actions like wind or body movements to generate energy.[47][48] Textiles are all around us. The textile is a component of basic needs like food and shelter. Textiles are everywhere in our lives, from bath towels to space suits. Textiles help humans by comforting, protecting, and extending their lives. Textiles meet our clothing needs, keeping us warm in the winter and cool in the summer. There are several applications for textiles, such as medical textiles, intelligent textiles, and automotive textiles. All of them contribute to the well-being of humans.[9] The term "serviceability" refers to a textile product's ability to meet the needs of consumers. The emphasis is on knowing the target market and matching the needs of the target market to the product's serviceability. Serviceability or performance in textiles is the ability of textile materials to withstand various conditions, environments, and hazards. Aesthetics, durability, comfort and safety, appearance retention, care, environmental impact, and cost are the serviceability concepts employed in structuring the material.[clarification needed][49] Fibers, yarns, fabric construction, finishes and design are components of a textile product. The selection of specific components varies with the intended use, therefore the fibers, yarns, and fabric manufacturing systems are selected with consideration of the required performance.[49] Commercial textiles/ Domestic textiles End uses Technical textiles/ Industrial purpose textiles End uses Clothing Clothing items for men, women and children. nightwear, sportswear, lingerie, undergarments, swimsuit. Accessories such as caps, umbrella, socks, gloves, and handbags.[4][50] Agro-textiles Agro-textiles are used in agriculture, horticulture, aquaculture, landscape gardening and forestry. Mainly for crop protection, in crop development for instance shade nets, thermal insulation and sunscreen materials, windshield, antibird nets, covering livestock protection, suppressing weed and insect control, etc.[51] Furnishing Upholstery, curtains, draperies, carpets, towels.[4][50] Geotextile Technical textiles which are used in civil engineering, roads, airfields, railroads, embankments, retaining structures, reservoirs, canals, dams, bank protection, coastal engineering and construction site silt fences, and protection of melting glaciers.[52] Bedding Bed sheets, khes, blankets, pillows.[4][50] Automotive textile Airbags, seat belts, headliners, upholstery, car carpets, and door card.[53] Others Shower curtains.[4] Medical textile implants, sutures, dressings, bandages, medical gowns, face masks.[4] Indutech This particular sector includes conveyor belts, drive belts, ropes and cordages, filtration products, glass battery separators, decatising and bolting cloth, AGM (absorption glass mat) plasma screens, coated abrasives, composite materials, printed circuit boards, printer ribbon, seals, gaskets, paper making fabrics.[6] Textiles, textile production, and clothing were necessities of life in prehistory, intertwined with the social, economic, and religious systems. Other than clothing, textile crafts produced utilitarian, symbolic, and opulent items. Archaeological artifacts from the Stone Age and the Iron Age in Central Europe are used to examine prehistoric clothing and its role in forming individual and group identities.[54] Artifacts unearthed in various archaeological excavations informs us about the remains of past human life and their activities.[55] Dyed flax fibers discovered in the Republic of Georgia indicate that textile-like materials were developed during the Paleolithic period. Radiocarbon dates the microscopic fibers to 36,000 years ago, when modern humans migrated from Africa.[25] Several textile remnants, such as the Inca Empire's textile arts remnants, which embody the Incas' aesthetics and social ideals, serve as a means for disseminating information about numerous civilizations, customs, and cultures.[56][57] There are textile museums that display history related to many aspects of textiles. A textile museum raises public awareness and appreciation of the artistic merits and cultural significance of the world's textiles on a local, national, and international scale. The George Washington University Museum and Textile Museum in Washington, D.C., was established in 1925.[58] The Bayeux Tapestry is a rare example of secular Romanesque art. The art work depicts the Norman Conquest of England in 1066.[59][60] Main article: Textile arts Textiles are also used for decorative art. Appliqué work of pipili is decorative art of Odisha, a state in eastern India, used for umbrellas, wall hangings, lamp shades, and bags. To make a range of decorative products, colored cloth in the shapes of animals, birds, flowers, are sewn onto a base cloth.[61] This section needs expansion with: summarize article Textile arts to give indication of the range of textile arts.. You can help by adding to it. (September 2023) Architextiles, a combination of the words architecture and textile, are textile-based assemblages. Awnings are a basic type of architectural textile.[62] Mughal Shahi Lal Dera Tent, which was a movable palace, is an example of the architextiles of the Mughal period.[63] Textiles had been used as currency as well. In Africa, textiles were used as currency in addition to being used for clothing, headwear, swaddling, tents, sails, bags, sacks, carpets, rugs, curtains, etc.[64] Along the east–west axis in sub-Saharan Africa, cloth strip, which was typically produced in the savannah, was used as a form of currency.[65] Textiles were among the objects offered to the gods [votive offering] in ancient Greece for religious purposes.[66] Main article: Fiber The smallest component of a fabric is fiber; fibers are typically spun into yarn, and yarns are used to make fabrics. Fibers are very thin and hair-like structures. The sources of fibers may be natural, synthetic, or both.[9][67] Global fiber production per person has increased from 8.4 kilograms in 1975 to 14.3 kilograms in 2021.[clarification needed] After a modest drop due to COVID-19 pandemic in 2020, global fiber output rebounded to 113 million tons in 2021. Global fiber output roughly doubled from 58 million tons in 2000 to 113 million tons in 2021 and is anticipated to reach 149 million tons in 2030.[68] The demand for synthetic fibers is increasing rapidly. This has numerous causes. Reasons include its low price, the demand-supply imbalance of cotton, and its [Synthetic fibers'] versatility in design and application. Synthetic fibers accounts for 70% of global fiber use, mainly polyester.[69] By 2030, the synthetic fiber market will reach 98.21 billion US dollars. From 2022 to 2030, the market is anticipated to increase by 5.1% per year.[70] Natural fibers are obtained from plants, animals and minerals.[71] Since prehistoric times, textiles have been made from natural fibers. Natural fibers are further categorized as cellulosic, protein, and mineral.[72] Synthetic or manmade fibers are manufactured with chemical synthesis.[71] Semi-synthetic: A subset of synthetic or manmade fibers is semi-synthetic fiber. Rayon is a classified as a semi-synthetic fiber, made with natural polymers. Monomers are the building blocks of polymers. Polymers in fibers are of two types: additive or condensation. Natural fibers, such as cotton and wool, have a condensation polymer type, whereas synthetic fibers can have either an additive or a condensation polymer type. For example, acrylic fiber and olefin fibers have additive polymers, and nylon and polyester are condensation polymers.[73] Types of fibers[74] Natural Synthetic Semi-synthetic Cellulosic fibers (Vegetable or plant fibers) Protein fibers (Animal fibers) Mineral fibers Petroleum based Cellulose based Cotton Wool Asbestos Nylon Rayon Linen Silk Glass fiber Polyester Acetate Jute Acrylic fiber Triacetate Hemp Olefin fiber Bamboo Fiber Spandex Aramid Fiber properties influence textile characteristics such as aesthetics, durability, comfort, and cost.[75] Fineness is one of the important characteristics of the fibers. They have a greater length-to-width ratio [100 times the diameter]. Fibers need to be strong, cohesive, and flexible. The usefulness of fibers are characterized on the basis of certain parameters such as strength, flexibility, and length to diameter ratio, and spinnability. Natural fibers are relatively short [staple] in length. Synthetic fibers are produced in longer lengths called filaments. Silk is the only natural fiber that is a filament. The classification of fibers is based on their origin, derivation, and generic types.[9][67] Certain properties of synthetic fibers, such as their diameter, cross section, and color, can be altered during production.[76] Cotton: Cotton has a long history of use in the clothing due to its favorable properties. This fiber is soft, moisture-absorbent, breathable, and is renowned for its long durability. Fabric or yarn produced with a combination of two or more types of different fibers, or yarns to obtain desired traits. Blending is possible at various stages of textile manufacturing. Final composition is liable for the properties of the resultant product. Natural and synthetic fibers are blended to overcome disadvantage of single fiber properties and to achieve better performance characteristics and aesthetic effects such as devoré, heather effect, cross dyeing and stripes pattern etc. Clothing woven from a blend of cotton and polyester can be more durable and easier to maintain than material woven solely from cotton. Other than sharing functional properties, blending makes the products more economical.[77][78] Union or Union fabrics is the 19th century term for blended fabrics. While it is no longer in use.[79] Mixture or mixed cloth is another term used for blended cloths when different types of yarns are used in warp and weft sides.[80][81] Blended textiles are not new. Mashru was a 16th-century fabric, is one of the earliest forms of "mixed cloth", a material composed of silk and cotton.[82] Siamoise was a 17th-century cotton and linen material.[83] Fiber composition[84] the fiber blend composition of mixtures of the fibers,[85] is an important criterion to analyze the behavior, properties such as functional aspects, and commercial classification of the merchandise.[86][87][88] The most common blend is cotton and polyester. Regular blended fabric is 65% polyester and 35% cotton. It is called a reverse blend if the ratio of cotton predominates—the percentage of the fibers changes with the price and required properties. Blending adds value to the textiles; it helps in reducing the cost (artificial fibers are less expensive than natural fibers) and adding advantage in properties of the final product.[89][90] For instance, a small amount of spandex adds stretch to the fabrics.[91] Wool can add warmth.[92] Bridal gown made from nettle fibers, probably worn by Eleonora Sophie Rantzau (1779-) at her wedding to Preben Bille-Brahe, Hvedholm Castle. National Museum of Denmark. Grass, rush, hemp, and sisal are all used in making rope.[93] In the first two, the entire plant is used for this purpose, while in the last two, only fibers from the plant are used. Coir (coconut fiber) is used in making twine, and also in floormats, doormats, brushes, mattresses, floor tiles, and sacking. Straw and bamboo are both used to make hats. Straw, a dried form of grass, is also used for stuffing, as is kapok. Fibers from pulpwood trees, cotton, rice, hemp, and nettle are used in making paper. Cotton, flax, jute, hemp, modal, banana, bamboo, lotus, eucalyptus, mulberry, and sugarcane are all used in clothing.[94][95][96] Piña (pineapple fiber) and ramie are also fibers used in clothing, generally with a blend of other fibers such as cotton. Nettles have also been used to make a fiber and fabric very similar to hemp or flax. The use of milkweed stalk fiber has also been reported, but it tends to be somewhat weaker than other fibers like hemp or flax. The inner bark of the lacebark tree is a fine netting that has been used to make clothing and accessories as well as utilitarian articles such as rope. Acetate is used to increase the shininess of certain fabrics such as silks, velvets, and taffetas. Seaweed is used in the production of textiles: a water-soluble fiber known as alginate is produced and is used as a holding fiber; when the cloth is finished, the alginate is dissolved, leaving an open area. Rayon is a manufactured fiber derived from plant pulp.[97] Different types of rayon can imitate feel and texture of silk, cotton, wool, or linen. Fibers from the stalks of plants, such as hemp, flax, and nettles, are also known as 'bast' fibers. Hemp fiber is yellowish-brown fiber made from the hemp plant. The fiber characteristics are coarser, harsher,[clarification needed] strong and lightweight. Hemp fiber is used primary to make twine, rope and cordage.[98] Animal textiles are commonly made from hair, fur, skin, or silk (in the case of silkworms).[clarification needed] Wool refers to the hair of the domestic sheep or goat, which is distinguished from other types of animal hair in that the individual strands are coated with scales and tightly crimped, and the wool as a whole is coated with a wax mixture known as lanolin (sometimes called wool grease), which is waterproof and dirtproof.[99] The lanolin and other contaminants are removed from the raw wool before further processing.[100] Woolen refers to a yarn produced from carded, non-parallel fibre, while worsted refers to a finer yarn spun from longer fibers which have been combed to be parallel. Other animal textiles which are made from hair or fur are alpaca wool, vicuña wool, llama wool, chiengora, shatoosh, yak fiber and camel hair, generally used in the production of coats, jackets, ponchos, blankets, and other warm coverings. Cashmere, the hair of the Indian cashmere goat, and mohair, the hair of the North African angora goat, are types of wool known for their softness. Pashmina is a type of very fine cashmere wool. Used in the production of sweaters and scarfs. Angora refers to the long, thick, soft hair of the angora rabbit. Qiviut is the fine inner wool of the muskox. Silk is an animal textile made from the fibres of the cocoon of the Chinese silkworm which is spun into a smooth fabric prized for its softness. There are two main types of the silk: 'mulberry silk' produced by the Bombyx mori, and 'wild silk' such as Tussah silk (wild silk). Silkworm larvae produce the first type if cultivated in habitats with fresh mulberry leaves for consumption, while Tussah silk is produced by silkworms feeding purely on oak leaves. Around four-fifths of the world's silk production consists of cultivated silk.[101] Silk products include pillow covers, dresses, tops, skirts, bed sheets, curtains. Bacterial cellulose can be made from industrial organic and agricultural waste, and used as material for textiles and clothing.[102] Asbestos and basalt fibre are used for vinyl tiles, sheeting and adhesives, "transite" panels and siding, acoustical ceilings, stage curtains, and fire blankets. Glass fibre is used in the production of ironing board and mattress covers, ropes and cables, reinforcement fibre for composite materials, insect netting, flame-retardant and protective fabric, soundproof, fireproof, and insulating fibres. Glass fibres are woven and coated with Teflon to produce beta cloth, a virtually fireproof fabric which replaced nylon in the outer layer of United States space suits since 1968.[103] Metal fibre, metal foil, and metal wire have a variety of uses, including the production of cloth-of-gold and jewellery. Hardware cloth (US term only) is a coarse woven mesh of steel wire, used in construction. It is much like standard window screening, but heavier and with a more open weave. Minerals and natural and synthetic fabrics may be combined, as in emery cloth, a layer of emery abrasive glued to a cloth backing. Also, "sand cloth" is a US term for fine wire mesh with abrasive glued to it, employed like emery cloth or coarse sandpaper. In the 20th century, they were supplemented by artificial fibers made from petroleum. Textiles are made in various strengths and degrees of durability, from the finest microfibre made of strands thinner than one denier to the sturdiest canvas. Synthetic textiles are used primarily in the production of clothing, as well as the manufacture of geotextiles. Synthetic fibers are those that are constructed by humans through chemical synthesis. Polyester fibre is used in all types of clothing, either alone or blended with fibres such as cotton. Aramid fibre (e.g. Twaron) is used for flame-retardant clothing, cut-protection, and armour. Acrylic is a fibre used to imitate wools,[104] including cashmere, and is often used in replacement of them. Nylon is a fibre used to imitate silk; it is used in the production of pantyhose. Thicker nylon fibres are used in rope and outdoor clothing. Spandex (trade name Lycra) is a polyurethane product that can be made tight-fitting without impeding movement. It is used to make activewear, bras, and swimsuits. Olefin fibre is a fibre used in activewear, linings, and warm clothing. Olefins are hydrophobic, allowing them to dry quickly. A sintered felt of olefin fibres is sold under the trade name Tyvek. Ingeo is a polylactide fibre blended with other fibres such as cotton and used in clothing. It is more hydrophilic than most other synthetics, allowing it to wick away perspiration. Lurex is a metallic fibre used in clothing embellishment. Milk proteins have also been used to create synthetic fabric. Milk or casein fibre cloth was developed during World War I in Germany, and further developed in Italy and America during the 1930s.[105] Milk fibre fabric is not very durable and wrinkles easily, but has a pH similar to human skin and possesses anti-bacterial properties. It is marketed as a biodegradable, renewable synthetic fibre.[106] Carbon fibre is mostly used in composite materials, together with resin, such as carbon fibre reinforced plastic. The fibres are made from polymer fibres through carbonization. Main articles: Textile manufacturing and Textile industry Textile manufacturing has progressed from prehistoric crafts to a fully automated industry.[73] Over the years, there have been continuous improvements in fabric structure and design.[107] Production methods Production method Description Inventors, inventions and milestones in progression Barkcloth Barkcloth is made by pounding bark until it is soft and flat.[108][109] Bark is an older known fabric; ancient people around the world wore bark cloth daily until woven fabrics replaced it. In Indonesia, the bark cloth is associated with the Torajan people, who made it from the fermentation of inner bark of certain local trees, mulberry and pandanus. The Torajans used stones and wooden beaters to produce bark cloth.[110] Barkcloth dress of Lore Bada people in Lore Valley, Poso Regency, Central Sulawesi, Indonesia. This collection of Central Sulawesi Museum was exhibited in Textile Museum Jakarta in November 2016. Felt and other nonwoven fabrics Felting is a method of manufacturing fabric directly from fibers by entangling, interlocking the fibers by mechanical action (like rubbing and pressing) and often aided by heat and moisture.[109] Felting is another old method of fabric manufacturing. While civilizations in the western Mediterranean improved their weaving skills, nomads in Central Asia learned how to make felt, a non-woven material, from wool.[111][109] Felting involves applying pressure and friction to a mat of fibers, working and rubbing them together until the fibers become interlocked and tangled, forming a nonwoven textile. A liquid, such as soapy water, is usually added to lubricate the fibers, and to open up the microscopic scales on strands of wool.[109] More recently, additional methods have been developed to bond fibers into nonwoven fabrics, including needle punching, adhesives, and chemical binding.[111][109][7] Kazakh felt yurt Spunbond nonwoven fabric Weaving Weaving is a textile production method which involves interlacing a set of longer threads (called the warp) with a set of crossing threads (called the weft). This is done on a frame or machine known as a loom, of which there are a number of types. Some weaving is still done by hand, but the vast majority is mechanized.[112] Handlooms: Early looms date to 5000 BC. From antiquity until the mediaeval times, the loom improved in both Asia and Europe, despite the fact that the loom's fundamental operation remained unchanged.[113] In 200 BC, the Chinese invented vertical looms and pedal looms, transforming the craft into an industry. By decreasing the worker's workload, innovative solutions improved productivity. There were harnesses and heddles to govern the movement of the warp yarn, a shuttle to transport the weft yarns, a reed to compact the cloth, and a take up roller to roll down the cloth. By the 1st century AD, all necessary components for a loom were assembled.[114] Power looms: John Kay invented the flying shuttle in 1734 in Bury, Lancashire. It was one of the first innovations in the cotton woven fabric industry.[115] Samuel Crompton invented a spinning machine in 1779 that produced yarn faster than ever before. Then Edmund Cartwright invented the first power loom in 1785.[116] Jacquard loom: The Jacquard machine was a modified version of programmable loom developed in 1804. It was developed by Joseph Marie Jacquard based on earlier inventions by Basile Bouchon (1725), Jean Baptiste Falcon (1728), and Jacques Vaucanson (1740). The industrial revolution in the 18th century led to mass production of yarn and cloth, which led to the growth of the woven fabric part of the textile industry.[117] Warp and weft Knitting Knitting involves interlacing loops of yarn, which are formed either on a knitting needle, needle, or on a crochet hook, together in a line. The processes are different in that knitting has several active loops at one time, on the knitting needle waiting to interlock with another loop.[118] Hand knitting: Though knitting was developed by Danes around 900 BC it did not reach to other civilizations until 900 AD.[111] Europe learned to knit by hand around 1400. Three to four stockings could be knit in a week by 1450. William Lee invented a stocking frame in 1589 that could knit one stocking per day. Acceptance of Lee's invention and subsequent modifications resulted in a wide range of fabrics in Europe.[119] The machine knitting is separated into two main groups of production processes: warp knitting and weft knitting. Loop formation. Structure of stockinette stitch in a weft knitted fabric. Nålebinding Nålebinding involves the use of a needle to form loops of yarn, by passing the full length of yarn through each loop (unlike knitting and crocheting). Nålebinding is a precursor of crocheting and knitting. Mittens produced by nålebinding Crocheting Crocheting never involves more than one active stitch on the needle. Knitting can be performed by machine, but crochet can only be performed by hand.[118] Crocheting was originally practised by Scottish peasants with a small, hooked needle known as a shepherd's hook.[120] Most crochet uses one hook and works upon one stitch at a time. Crochet may be worked in circular rounds without any specialized tools, as shown here. Spread tow Spread tow is a production method where the tow fibers are spread into thin tapes, and then the tapes are woven as warp and weft. This method is mostly used for composite materials; spread tow fabrics can be made in carbon, aramid and other fibers. Braiding or plaiting Braiding or plaiting involves intertwining threads together into cloth. Braiding Knotting Knotting involves tying threads together and is used in making tatting and macrame.[121][122] Lace Lace is made by interlocking threads together to create a fine fabric with open holes in the work. Lace can be made by either hand (e.g. needle lace or bobbin lace) or machine.[123] Bobbin lace in progress 3D Textiles Complex interlacement of yarns where the final product has not plain form as flat fabrics, but 3D form. All technologies - weft knitting, warp knitting, weaving and braiding allow production of complex products with 3D form if suitable machine configuration and pattern are used. This technologies are used for woven heart valves, composite profiles and other. Additive manufactured textile like structures Fabric manufacturing by 3D printer employs additive manufacturing, also known as additive layer manufacturing (ALM), a CAD-aided manufacturing technique that builds the object layer by layer. The method is used in manufacturing of Auxetic textiles and in composite materials.[124] 3D-printed outfit Important parameters in fabric selection: The primary consideration in fabric selection is the end use. The fabric needs vary greatly depending on the application. Similar types of fabric may not be suitable for all applications.[125] Fabric weight is an important criteria while producing different fabrics. A carpet requires a fabric with 1300 GSM, but a robe may be made with 160 GSM. Certainly, fabrics for clothes and carpets have distinct weights.[125] Range of fabric weights typically used in various textile products[126] GSM (grams per square meter) range Categorization Termed as Suitable for the textile products 0-50 Sheer fabric Sheer curtains, Lingerie items, Wedding dresses, 50-150 Light weight Top weight Blouse, Lining, Shirt, T-shirt, Dress 150–300 Medium weight Bottom weight Skirts, trousers, denims, and suits 300–600 Medium to heavy weight Bull denim Drapery, overcoat, towel, slipcover, workwear More than 600 Heavy Carpet, mat, upholstery, winter coats Stretchable fabrics have greater movability and are thus more comfortable than fabrics with no stretch or less stretch.[127] See also: List of countries by textile exports Top five exporters of textiles—2013($ billion) China 274 India 40 Italy 36 Germany 35 Bangladesh 28 Source:[128] According to the UN Commodity Trade Statistics Database, the global textiles and apparel export market reached $772 billion in 2013.[129] China is the largest exporter of textile goods. Most of China's exports consist of apparel, apparel accessories, textile yarns, and textile products. The competitive advantages of the China are low prices and abundant labor, lowered commercial obstacles, and a ready supply of raw materials. China, along with the United States and India, is a major producer of cotton.[130][131] China's apparel market share has declined in recent years due to various reasons and a shift toward high-end, sophisticated products. Additionally, the investors from China made stakes in Myanmar, Vietnam, and Cambodia. Last year, its market share was 36.7%, or $161 billion, a decline of 8% year-over-year. In other words, China lost $14 billion in garment work orders to other countries in a single year. In 2016, Bangladesh's apparel market share was valued at $28 billion, increasing 7.69 percent from the previous year. In 2016 the leading exporters of apparel were China ($161 billion), Bangladesh ($28 billion), Vietnam ($25 billion), India ($18 billion), Hong Kong ($16 billion), Turkey ($15 billion), and Indonesia ($7 billion).[132] Garment exports from Bangladesh reached record high in the 2021–2022 fiscal year; China ($220,302 billion), Bangladesh ($38.70 billion), India ($8.127 billion), Pakistan ($19.33 billion).[133] Early method of bleaching cotton and linen goods on lawns The fabric, when it leaves a loom or knitting machine, is not readily usable. It may be rough, uneven, or have flaws like skewing. Hence, it is necessary to finish the fabric. Finishing techniques enhance the value of the treated fabrics.[114] After manufacturing, textiles undergo a range of finishing procedures, including bleaching, dyeing, printing, as well as mechanical and chemical finishing.[12] Textiles are often dyed, with fabrics available in almost every colour. The dyeing process often requires several dozen gallons of water for each pound of clothing.[134] Coloured designs in textiles can be created by weaving together fibres of different colours (tartan or Uzbek Ikat), adding coloured stitches to finished fabric (embroidery), creating patterns by resist dyeing methods, tying off areas of cloth and dyeing the rest (tie-dyeing), drawing wax designs on cloth and dyeing in between them (batik), or using various printing processes on finished fabric. Woodblock printing, still used in India and elsewhere today, is the oldest of these dating back to at least 220 CE in China. Textiles are also sometimes bleached, making the textile pale or white. In textiles, color matching extends beyond selecting the appropriate dyestuffs or pigments and combining them in precise proportions to achieve the desired end product color.[135] Meeting criteria for fastness, cost, and quality is also essential. This process plays a critical role in materializing a designer's concept into an actual product.[135] Textile finishing is the process of converting the loomstate or raw goods into a useful product, which can be done mechanically or chemically. Finishing is a broad term that refers to a variety of physical and chemical techniques and treatments that finish one stage of textile production while also preparing for the next. Textile finishing can include aspects like improving surface feel, aesthetical enhancement, and adding advanced chemical finishes.[12] A finish is any process that transforms unfinished products into finished products.[136] This includes mechanical finishing and chemical applications which alter the composition of treated textiles (fiber, yarn or fabric.) Since the 1990s, with advances in technologies such as permanent press process, finishing agents have been used to strengthen fabrics and make them wrinkle free.[137] More recently, nanomaterials research has led to additional advancements, with companies such as Nano-Tex and NanoHorizons developing permanent treatments based on metallic nanoparticles for making textiles more resistant to things such as water, stains, wrinkles, and pathogens such as bacteria and fungi.[138] Textiles receive a range of treatments before they reach the end-user. From formaldehyde finishes (to improve crease-resistance) to biocidic finishes and from flame retardants to dyeing of many types of fabric, the possibilities are almost endless. However, many of these finishes may also have detrimental effects on the end user. A number of disperse, acid and reactive dyes, for example, have been shown to be allergenic to sensitive individuals.[139] Further to this, specific dyes within this group have also been shown to induce purpuric contact dermatitis.[140] Eisengarn, meaning "iron yarn" in English, is a light-reflecting, strong material invented in Germany in the 19th century. It is made by soaking cotton threads in a starch and paraffin wax solution. The threads are then stretched and polished by steel rollers and brushes. The result of the process is a lustrous, tear-resistant yarn which is extremely hardwearing.[141][142] Finishing techniques Finishing Fabrics Brushing Carpets, rugs, velvet, velour, and velveteen, referred to as pile fabrics, are made by interlacing a secondary yarn through woven cloth, creating a tufted layer known as a nap or pile.[143] Shearing "Shearing machine" is a machine equipped with shearing cylinder, ledger blade, fluff exhaust, and joint seam sensors. The machine operates similarly to a lawn mower.[144][145] Moleskin and velvet are sheared materials in which pile is cut to a certain level.[146] After the oil industry, the fashion industry is the second biggest polluter of agricultural land, which has several harmful impacts on the environment. As the industry grows, the effect on the environment is worsening.[147] Textile manufacturing is one of the oldest and most technologically complicated industries. This industry's fundamental strength stems from its solid manufacturing base of a diverse range of fibers/yarns ranging from natural fibers such as jute, silk, wool, and cotton, to synthetic or manufactured fibers that include polyester, viscose, nylon, and acrylic. Textile mills and their wastewater have grown in proportion to the increase in demand for textile products, generating a severe pollution concern around the world. Numerous textile industry chemicals pose environmental and health risks. 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Transportation during the 2024 Summer Olympics and Paralympics constituted a major challenge for the organisers due to the scale of the event. Over €500 million was invested in improvements to transportation infrastructure for the games. A mobile app was developed to facilitate travel by offering a route calculator, and 5,000 agents were deployed at stations and bus stops to assist travellers. A goal of Paris 2024 was to halve the average carbon footprint of the London 2012 and Rio 2016 games. The organisers estimated that more than a third of the greenhouse gas emissions would be from the transport of athletes and spectators. All venues were made accessible by public transport and bicycle, with 415 kilometres (258 mi) of cycle paths created to link the venues and 27,000 bicycle racks installed. Public transport was extended and services increased. The goal was met, with an estimated 54.6% reduction, representing 1.59 million tonnes of CO2 equivalent. (Full article...) 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Augustine of Canterbury (d. 604)Isaac Franklin (b. 1789)Jeremy Corbyn (b. 1949)Elizabeth Peer (d. 1984) More anniversaries: May 25 May 26 May 27 Archive By email List of days of the year About Tom Cruise Top Gun: Maverick, a 2022 American action drama film directed by Joseph Kosinski, garnered accolades in a variety of categories, with particular recognition for Tom Cruise's (pictured) performance as well as its sound and visual effects, cinematography, and film editing. It received six nominations at the 95th Academy Awards, including Best Picture, and won Best Sound. At the 76th British Academy Film Awards, The film was nominated for Best Cinematography, Best Editing, Best Sound, and Best Special Visual Effects. Maverick received six nominations at the 28th Critics' Choice Awards and won Best Cinematography. It garnered two nominations at the 80th Golden Globe Awards. 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This bluespotted ribbontail ray was photographed in the Red Sea off the coast of Egypt. Photograph credit: Diego Delso Recently featured: Black Lives Matter art Germanicus The Cocoanuts Archive More featured pictures Community portal – The central hub for editors, with resources, links, tasks, and announcements. Village pump – Forum for discussions about Wikipedia itself, including policies and technical issues. Site news – Sources of news about Wikipedia and the broader Wikimedia movement. Teahouse – Ask basic questions about using or editing Wikipedia. Help desk – Ask questions about using or editing Wikipedia. Reference desk – Ask research questions about encyclopedic topics. Content portals – A unique way to navigate the encyclopedia. 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For the ceremony for films released in 1995, see 68th Academy Awards. 95th Academy AwardsOfficial posterDateMarch 12, 2023SiteDolby TheatreHollywood, Los Angeles, California, U.S.Hosted byJimmy KimmelPreshow hosts Ashley Graham Vanessa Hudgens Lilly Singh[1] Produced by Glenn Weiss Ricky Kirshner Directed byGlenn WeissHighlightsBest PictureEverything Everywhere All at OnceMost awardsEverything Everywhere All at Once (7)Most nominationsEverything Everywhere All at Once (11)TV in the United StatesNetworkABCDuration3 hours, 37 minutes[2]Ratings 18.75 million[3] 9.9% (Nielsen ratings) ← 94th Academy Awards 96th → The 95th Academy Awards ceremony, presented by the Academy of Motion Picture Arts and Sciences (AMPAS), took place on March 12, 2023, at the Dolby Theatre in Hollywood, Los Angeles. During the gala, the AMPAS presented Academy Awards (commonly referred to as Oscars) in 23 categories honoring films released in 2022. The ceremony, televised in the United States by ABC, was produced by Glenn Weiss and Ricky Kirshner, with Weiss also serving as director. Comedian Jimmy Kimmel hosted the show for the third time, following the 89th ceremony in 2017 and the 90th ceremony in 2018.[4] In related events, the Academy held its 13th annual Governors Awards ceremony at the Fairmont Century Plaza Hotel in Century City, California, on November 19, 2022. The Academy Scientific and Technical Awards were presented by host Simu Liu on February 24, 2023, in a ceremony at the Academy Museum of Motion Pictures in Los Angeles.[5] Everything Everywhere All at Once won seven awards, including Best Picture.[6][7] Other winners included All Quiet on the Western Front with four awards, The Whale with two, and Avatar: The Way of Water, Black Panther: Wakanda Forever, The Boy, the Mole, the Fox and the Horse, The Elephant Whisperers, Guillermo del Toro's Pinocchio, An Irish Goodbye, Navalny, RRR, Top Gun: Maverick, and Women Talking with one. The telecast drew 18.75 million viewers in the United States.[3] The nominees for the 95th Academy Awards were announced on January 24, 2023, at the Samuel Goldwyn Theater in Beverly Hills, by actors Riz Ahmed and Allison Williams.[8] Everything Everywhere All at Once led all nominees with eleven nominations; All Quiet on the Western Front and The Banshees of Inisherin tied for second with nine nominations each.[9][10] The winners were announced during the awards ceremony on March 12, 2023. Everything Everywhere All at Once became the first science fiction film to win Best Picture,[11] and became the third film, alongside A Streetcar Named Desire (1951) and Network (1976), to win three acting awards.[12] Best Director winners Daniel Kwan and Daniel Scheinert became the third pair of directors to win for the same film.[a] For the first time since the 7th ceremony in 1935, all five Best Actor nominees were first-time nominees.[13] Michelle Yeoh became the first Asian winner for Best Actress and the second woman of color overall after Halle Berry, who won for her performance in Monster's Ball (2001).[14] Furthermore, she became the first woman to identify as Asian to be nominated in that category.[b] Ke Huy Quan became the first Vietnamese person to win an Oscar and the second Asian winner for Best Supporting Actor after Haing S. Ngor, who won for his role in The Killing Fields (1984).[15][16] The 42-year span between Judd Hirsch's first nomination, for his supporting role in Ordinary People (1980), and his second, for The Fabelmans, set the record for the longest gap between Oscar nominations.[13] At age 90, Best Original Score nominee John Williams became the oldest person nominated competitively in Oscars history.[13] Best Costume Design winner Ruth E. Carter became the first Black woman to win two Oscars.[17] Daniel Scheinert and Daniel Kwan, Best Picture co-winners, and Best Director and Best Original Screenplay winners Brendan Fraser, Best Actor winner Michelle Yeoh, Best Actress winner Ke Huy Quan, Best Supporting Actor winner Jamie Lee Curtis, Best Supporting Actress winner Sarah Polley, Best Adapted Screenplay winner Guillermo del Toro, Best Animated Feature co-winner Edward Berger, Best International Feature Film winner Daniel Roher, Best Documentary Feature Film co-winner Kartiki Gonsalves, Best Documentary Short Subject co-winner Volker Bertelmann, Best Original Score winner M. M. Keeravani, Best Original Song co-winner James Friend, Best Cinematography winner Ruth E. Carter, Best Costume Design winner Paul Rogers, Best Film Editing winner Joe Letteri, Best Visual Effects co-winner Eric Saindon, Best Visual Effects co-winner Winners are listed first, highlighted in boldface, and indicated with a double dagger (‡).[18] Best Picture Everything Everywhere All at Once – Daniel Kwan, Daniel Scheinert, and Jonathan Wang, producers‡ All Quiet on the Western Front – Malte Grunert, producer Avatar: The Way of Water – James Cameron and Jon Landau, producers The Banshees of Inisherin – Graham Broadbent, Peter Czernin, and Martin McDonagh, producers Elvis – Baz Luhrmann, Catherine Martin, Gail Berman, Patrick McCormick, and Schuyler Weiss, producers The Fabelmans – Kristie Macosko Krieger, Steven Spielberg, and Tony Kushner, producers Tár – Todd Field, Alexandra Milchan, and Scott Lambert, producers Top Gun: Maverick – Tom Cruise, Christopher McQuarrie, David Ellison, and Jerry Bruckheimer, producers Triangle of Sadness – Erik Hemmendorff and Philippe Bober, producers Women Talking – Dede Gardner, Jeremy Kleiner, and Frances McDormand, producers Best Directing Daniel Kwan and Daniel Scheinert – Everything Everywhere All at Once‡ Martin McDonagh – The Banshees of Inisherin Steven Spielberg – The Fabelmans Todd Field – Tár Ruben Östlund – Triangle of Sadness Best Actor in a Leading Role Brendan Fraser – The Whale as Charlie‡ Austin Butler – Elvis as Elvis Presley Colin Farrell – The Banshees of Inisherin as Pádraic Súilleabháin Paul Mescal – Aftersun as Calum Patterson Bill Nighy – Living as Mr. Rodney Williams Best Actress in a Leading Role Michelle Yeoh – Everything Everywhere All at Once as Evelyn Quan Wang‡ Cate Blanchett – Tár as Lydia Tár Ana de Armas – Blonde as Norma Jeane Andrea Riseborough – To Leslie as Leslie Rowlands Michelle Williams – The Fabelmans as Mitzi Fabelman Best Actor in a Supporting Role Ke Huy Quan – Everything Everywhere All at Once as Waymond Wang‡ Brendan Gleeson – The Banshees of Inisherin as Colm Doherty Brian Tyree Henry – Causeway as James Aucoin Judd Hirsch – The Fabelmans as Uncle Boris Barry Keoghan – The Banshees of Inisherin as Dominic Kearney Best Actress in a Supporting Role Jamie Lee Curtis – Everything Everywhere All at Once as Deirdre Beaubeirdre‡ Angela Bassett – Black Panther: Wakanda Forever as Queen Ramonda Hong Chau – The Whale as Liz Kerry Condon – The Banshees of Inisherin as Siobhán Súilleabháin Stephanie Hsu – Everything Everywhere All at Once as Joy Wang / Jobu Tupaki Best Writing (Original Screenplay) Everything Everywhere All at Once – Daniel Kwan and Daniel Scheinert‡ The Banshees of Inisherin – Martin McDonagh The Fabelmans – Steven Spielberg and Tony Kushner Tár – Todd Field Triangle of Sadness – Ruben Östlund Best Writing (Adapted Screenplay) Women Talking – Sarah Polley; based on the novel by Miriam Toews‡ All Quiet on the Western Front – Edward Berger, Lesley Paterson, and Ian Stokell; based on the novel by Erich Maria Remarque Glass Onion: A Knives Out Mystery – Rian Johnson; based on characters created by Johnson and the film Knives Out Living – Kazuo Ishiguro; based on the original motion picture screenplay Ikiru by Akira Kurosawa, Shinobu Hashimoto, and Hideo Oguni Top Gun: Maverick – Screenplay by Ehren Kruger, Eric Warren Singer, and Christopher McQuarrie; story by Peter Craig and Justin Marks; based on the film Top Gun written by Jim Cash and Jack Epps Jr. Best Animated Feature Film Guillermo del Toro's Pinocchio – Guillermo del Toro, Mark Gustafson, Gary Ungar, and Alex Bulkley‡ Marcel the Shell with Shoes On – Dean Fleischer Camp, Elisabeth Holm, Andrew Goldman, Caroline Kaplan, and Paul Mezey Puss in Boots: The Last Wish – Joel Crawford and Mark Swift The Sea Beast – Chris Williams and Jed Schlanger Turning Red – Domee Shi and Lindsey Collins Best International Feature Film All Quiet on the Western Front (Germany) – directed by Edward Berger‡ Argentina, 1985 (Argentina) – directed by Santiago Mitre Close (Belgium) – directed by Lukas Dhont EO (Poland) – directed by Jerzy Skolimowski The Quiet Girl (Ireland) – directed by Colm Bairéad Best Documentary Feature Film Navalny – Daniel Roher, Odessa Rae, Diane Becker, Melanie Miller, and Shane Boris‡ All That Breathes – Shaunak Sen, Aman Mann, and Teddy Leifer All the Beauty and the Bloodshed – Laura Poitras, Howard Gertler, John Lyons, Nan Goldin, and Yoni Golijov Fire of Love – Sara Dosa, Shane Boris, and Ina Fichman A House Made of Splinters – Simon Lereng Wilmont and Monica Hellström Best Documentary Short Film The Elephant Whisperers – Kartiki Gonsalves and Guneet Monga‡ Haulout – Evgenia Arbugaeva and Maxim Arbugaev How Do You Measure a Year? – Jay Rosenblatt The Martha Mitchell Effect – Anne Alvergue and Beth Levison Stranger at the Gate – Joshua Seftel and Conall Jones Best Short Film (Live Action) An Irish Goodbye – Tom Berkeley and Ross White‡ Ivalu – Anders Walter and Rebecca Pruzan Le pupille – Alice Rohrwacher and Alfonso Cuarón Night Ride – Eirik Tveiten and Gaute Lid Larssen The Red Suitcase – Cyrus Neshvad Best Short Film (Animated) The Boy, the Mole, the Fox and the Horse – Charlie Mackesy and Matthew Freud‡ The Flying Sailor – Wendy Tilby and Amanda Forbis Ice Merchants – João Gonzalez and Bruno Caetano My Year of Dicks – Sara Gunnarsdóttir and Pamela Ribon An Ostrich Told Me the World Is Fake and I Think I Believe It – Lachlan Pendragon Best Music (Original Score) All Quiet on the Western Front – Volker Bertelmann‡ Babylon – Justin Hurwitz The Banshees of Inisherin – Carter Burwell Everything Everywhere All at Once – Son Lux The Fabelmans – John Williams Best Music (Original Song) "Naatu Naatu" from RRR – Music by M. M. Keeravani; lyrics by Chandrabose‡ "Applause" from Tell It Like a Woman – Music and lyrics by Diane Warren "Hold My Hand" from Top Gun: Maverick – Music and lyrics by Lady Gaga and BloodPop "Lift Me Up" from Black Panther: Wakanda Forever – Music by Tems, Rihanna, Ryan Coogler, and Ludwig Göransson; lyrics by Tems and Ryan Coogler "This Is a Life" from Everything Everywhere All at Once – Music by Ryan Lott, David Byrne, and Mitski; lyrics by Ryan Lott and David Byrne Best Sound Top Gun: Maverick – Mark Weingarten, James H. Mather, Al Nelson, Chris Burdon, and Mark Taylor‡ All Quiet on the Western Front – Viktor Prášil, Frank Kruse, Markus Stemler, Lars Ginzel, and Stefan Korte Avatar: The Way of Water – Julian Howarth, Gwendolyn Yates Whittle, Dick Bernstein, Christopher Boyes, Gary Summers, and Michael Hedges The Batman – Stuart Wilson, William Files, Douglas Murray, and Andy Nelson Elvis – David Lee, Wayne Pashley, Andy Nelson, and Michael Keller Best Production Design All Quiet on the Western Front – Production design: Christian M. Goldbeck; set decoration: Ernestine Hipper‡ Avatar: The Way of Water – Production design: Dylan Cole and Ben Procter; set decoration: Vanessa Cole Babylon – Production design: Florencia Martin; set decoration: Anthony Carlino Elvis – Production design: Catherine Martin and Karen Murphy; set decoration: Bev Dunn The Fabelmans – Production design: Rick Carter; set decoration: Karen O'Hara Best Cinematography All Quiet on the Western Front – James Friend‡ Bardo, False Chronicle of a Handful of Truths – Darius Khondji Elvis – Mandy Walker Empire of Light – Roger Deakins Tár – Florian Hoffmeister Best Makeup and Hairstyling The Whale – Adrien Morot, Judy Chin, and Annemarie Bradley‡ All Quiet on the Western Front – Heike Merker and Linda Eisenhamerová The Batman – Naomi Donne, Mike Marino, and Mike Fontaine Black Panther: Wakanda Forever – Camille Friend and Joel Harlow Elvis – Mark Coulier, Jason Baird, and Aldo Signoretti Best Costume Design Black Panther: Wakanda Forever – Ruth E. Carter‡ Babylon – Mary Zophres Elvis – Catherine Martin Everything Everywhere All at Once – Shirley Kurata Mrs. Harris Goes to Paris – Jenny Beavan Best Film Editing Everything Everywhere All at Once – Paul Rogers‡ The Banshees of Inisherin – Mikkel E. G. Nielsen Elvis – Matt Villa and Jonathan Redmond Tár – Monika Willi Top Gun: Maverick – Eddie Hamilton Best Visual Effects Avatar: The Way of Water – Joe Letteri, Richard Baneham, Eric Saindon, and Daniel Barrett‡ All Quiet on the Western Front – Frank Petzold, Viktor Müller, Markus Frank, and Kamil Jafar The Batman – Dan Lemmon, Russell Earl, Anders Langlands, and Dominic Tuohy Black Panther: Wakanda Forever – Geoffrey Baumann, Craig Hammack, R. Christopher White, and Dan Sudick Top Gun: Maverick – Ryan Tudhope, Seth Hill, Bryan Litson, and Scott R. Fisher The Academy held its 13th annual Governors Awards ceremony on November 19, 2022, during which the following awards were presented:[19] To Euzhan Palcy, a masterful filmmaker who broke ground for Black women directors and inspired storytellers of all kinds across the globe.[20] To Diane Warren, for her genius, generosity and passionate commitment to the power of song in film.[20] To Peter Weir, a fearless and consummate filmmaker who has illuminated the human experience with his unique and expansive body of work.[20] Michael J. Fox – "For his tireless advocacy of research on Parkinson's disease alongside his boundless optimism exemplifies the impact of one person in changing the future for millions."[21] Films with multiple nominations Nominations Film 11 Everything Everywhere All at Once 9 All Quiet on the Western Front The Banshees of Inisherin 8 Elvis 7 The Fabelmans 6 Tár Top Gun: Maverick 5 Black Panther: Wakanda Forever 4 Avatar: The Way of Water 3 Babylon The Batman Triangle of Sadness The Whale 2 Living Women Talking Films with multiple wins Awards Film 7 Everything Everywhere All at Once 4 All Quiet on the Western Front 2 The Whale The following individuals, listed in order of appearance, presented awards or performed musical numbers:[22] Presenters Name(s) Role Sylvia Villagran Served as announcer for the 95th Academy Awards[23] Emily Blunt Dwayne Johnson Presented the award for Best Animated Feature Ariana DeBose Troy Kotsur Presented the awards for Best Supporting Actor and Best Supporting Actress Cara Delevingne Introduced the performance of "Applause" Riz Ahmed Ahmir "Questlove" Thompson Presented the award for Best Documentary Feature Film and Best Live Action Short Film Halle Bailey Melissa McCarthy Presented the trailer for The Little Mermaid Michael B. JordanJonathan Majors Presented the award for Best Cinematography Donnie Yen Introduced the performance of "This Is a Life" Jennifer ConnellySamuel L. Jackson Presented the award for Best Makeup and Hairstyling Morgan FreemanMargot Robbie Presented the Warner Bros. 100 Years tribute Paul DanoJulia Louis-Dreyfus Presented the award for Best Costume Design Deepika Padukone Introduced the performance of "Naatu Naatu" Eva LongoriaJanet Yang Presented a montage promoting the Academy Museum of Motion Pictures Antonio BanderasSalma Hayek Pinault Presented the award for Best International Feature Film Elizabeth OlsenPedro Pascal Presented the awards for Best Documentary Short Film and Best Animated Short Film Hugh GrantAndie MacDowell Presented the award for Best Production Design John ChoMindy Kaling Presented the award for Best Original Score Elizabeth Banks Presented the award for Best Visual Effects Danai Gurira Introduced the performance of "Lift Me Up" Andrew GarfieldFlorence Pugh Presented the awards for Best Original Screenplay and Best Adapted Screenplay Kate HudsonJanelle Monáe Presented the award for Best Sound and Best Original Song John Travolta Presented the "In Memoriam" segment Zoe SaldañaSigourney Weaver Presented the award for Best Film Editing Idris ElbaNicole Kidman Presented the award for Best Director Halle BerryJessica Chastain Presented the awards for Best Actor and Best Actress Harrison Ford Presented the award for Best Picture Performers Name Role Work Rickey Minor Music director Conductor Orchestral Sofia Carson Diane Warren Performers "Applause" from Tell It Like a Woman David Byrne Stephanie Hsu Son Lux Performers "This Is a Life" from Everything Everywhere All at Once[24] Kaala Bhairava Rahul Sipligunj Performers "Naatu Naatu" from RRR Lady Gaga Performer "Hold My Hand" from Top Gun: Maverick Rihanna Performer "Lift Me Up" from Black Panther: Wakanda Forever Lenny Kravitz Performer "Calling All Angels" during the annual "In Memoriam" tribute Jimmy Kimmel hosted the 95th Academy Awards. In September 2022, the Academy hired television producers Glenn Weiss and Ricky Kirshner to oversee production of the 2023 ceremony.[25] AMPAS president Janet Yang and CEO Bill Kramer remarked that they looked "to deliver an exciting and energized show" with Weiss and Kirshner.[26] Two months later, comedian and talk show host Jimmy Kimmel was announced as host of the gala. "Being invited to host the Oscars for a third time is either a great honor or a trap," Kimmel stated in a press release regarding his selection. "Either way, I am grateful to the Academy for asking me so quickly after everyone good said no", he concluded.[27] Furthermore, AMPAS announced that all 23 categories would be presented live during the gala. The announcement came in response to an internal survey which indicated negative feedback regarding the previous year's decision to present eight below-the-line categories prior to the live portion of last year's gala.[28] In light of the Chris Rock–Will Smith slapping incident during the previous year's telecast, AMPAS announced that the organization hired a "crisis team" in the event a similar altercation or if an unexpected fiasco arose.[29] In an interview published by Time magazine, Kramer explained: "We have a whole crisis team, something we've never had before, and many plans in place. We've run many scenarios. So it is our hope that we will be prepared for anything that we may not anticipate right now but that we're planning for just in case it does happen."[30] The Dolby Theatre stage on the day of the ceremony Several others participated in the production of the ceremony and related events. Rickey Minor served as musical director for the ceremony.[31] Production designers Misty Buckley and Alana Billingsley, who were the first women-led design team for an Oscars telecast, designed a new stage for the show.[32] According to Buckley and Billingsley, the stage was designed to resemble Art Deco movie places from the Golden Age of Hollywood.[33] Additionally, the set utilized several LED panels that were used to display the category names, winners' names, or images from the nominated films.[34] Notably, the arrivals area along Hollywood Boulevard outside the Dolby Theatre was lined with a champagne-colored carpet, marking the first time since the 32nd ceremony in 1960 that a non-red colored carpet was utilized for the gala. According to red carpet consultant Lisa Love, the production team chose a lighter shade of carpet color in order to not clash with a sienna-colored tent erected to shield attendees from the sun or potential rain. She also added that the shades of color for both the carpet and tent were inspired by "watching the sunset on a white-sand beach at the 'golden hour' with a glass of champagne in hand, evoking calm and peacefulness".[35] Lady Gaga was initially not scheduled to perform her nominated song "Hold My Hand" from Top Gun: Maverick due to prior commitments involving her role in Joker: Folie à Deux. On the morning of the ceremony, however, it was reported that Gaga would perform at the ceremony.[36] Meanwhile, actress Glenn Close, who was originally scheduled as a presenter during the gala, canceled her appearance due to a positive COVID-19 test.[37] When the nominations were announced, nine of the ten films nominated for Best Picture had earned a combined gross of $1.57 billion at the American and Canadian box offices at the time. Top Gun: Maverick was the highest-grossing film among the Best Picture nominees with $718.7 million in domestic box office receipts.[38] Avatar: The Way of Water came in second with $598.4 million; this was followed by Elvis ($151 million), Everything Everywhere All at Once ($70 million), The Fabelmans ($15 million), The Banshees of Inisherin ($9 million), Tar ($5.6 million), Triangle of Sadness ($4.2 million), and Women Talking ($1.1 million). The box office figures for All Quiet on the Western Front were unavailable due to their distributor Netflix's policy of refusing to release such figures.[39] Furthermore, by virtue of Avatar: The Way of Water and Top Gun: Maverick's Best Picture nominations, it marked the first time since the 55th ceremony in 1983 that the two highest grossing films of the year were both nominated in the aforementioned category.[40] Andrea Riseborough's Best Actress nomination for To Leslie was controversial amongst critics and pundits, as Momentum Pictures, the film's distributor, did not fund a conventional advertising-driven awards campaign for the film. Instead, director Michael Morris and his wife, actress Mary McCormack, organized a "celeb-backed campaign" to get Riseborough nominated.[41][42] They contacted friends and colleagues in the entertainment industry, asking them to view the film and share it with others if they enjoyed it.[43] Morris and Riseborough also hired publicists to coordinate the efforts. While not initially regarded as a serious contender, the campaign raised Riseborough's profile; dozens of celebrities praised her performance on social media, and some hosted screenings of the film during voting for the Academy Award nominations in January 2023.[44][45] Riseborough's nomination was announced on January 24, which the Los Angeles Times called "one of the most shocking nominations in Oscar history".[43] After her nomination was announced, speculation arose that the tactics might have violated AMPAS rules against directly lobbying voters.[46] A post on the film's Instagram account was noted by several AMPAS members for possibly violating a rule prohibiting "[singling] out 'the competition' by name" by featuring a quote from film critic Richard Roeper, who praised Riseborough's performance as better than Cate Blanchett's in Tár, a fellow nominee for Best Actress.[47] On January 27, the Academy announced a review of the year's campaigns "to ensure that no guidelines were violated, and to inform us whether changes to the guidelines may be needed in a new era of social media and digital communication".[48] The Academy has rescinded nominations for nominees who participated in unsanctioned campaigning. However, there were no reports that Riseborough had been involved in such, or that any Academy members had lodged form