

Stages of expert research and their application in the forensic veterinary examination of animal carcasses

Ivan Yatsenko *

* Doctor of Veterinary Sciences, Professor, NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine, ORCID: <https://orcid.org/0000-0001-8903-2129>, e-mail: hniise@hniise.gov.ua

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It is proved that stages of expert research during forensic veterinary examination of animal carcasses are based on general methodological provisions of forensic science and contain at least four stages: preparatory (preliminary research), analytical (separate research), comparative, synthesizing (evaluation), not only reflecting the procedure of expert knowledge of properties of forensic veterinary examination objects, but also allowing to trace the process of examination and evaluate the results obtained during evaluation of the expert conclusion.

Each stage of expert research of animal carcasses is conditioned by various technical methods and tasks of research and provides the solution of intermediate tasks, which are mainly diagnostic in nature. The commonality of the stages reflects general points characteristic of any expert research as one of the varieties of forms of cognition. The variety lies in the part and number of same-named stages in the structure of diagnostic studies. The order of application of these stages contributes to a logically correct analysis of the pathomorphological features, and (on the basis of their comprehensive evaluation) formulation of the forensic veterinary diagnosis and the final expert conclusion.

A procedure for removing objects from an animal carcass and their subsequent laboratory examination, rules forensic veterinary examination of animal carcasses, guidelines for describing and assessing the condition of body parts and organs of the animal carcass, the conclusion of a forensic veterinary expert, have been developed.

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Keywords: forensic veterinary examination; animal carcasses; stages of expert research; process and tasks of diagnostic research; expert conclusion; techniques for describing and assessing the condition of body parts and organs of an animal carcass.

Formulation of Research Problem

In 2019, at the initiative of National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» in the institutions of forensic science of the Ministry of Justice of Ukraine, a new type of forensic examination — forensic veterinary examination was launched¹, which is a scientific study of objects performed by a veterinarian — forensic veterinary expert in order to provide the conclusion on issues that arose during the pre-trial investigation in criminal proceedings or the trial in any type of proceedings². This type of forensic examination has recently been actively not only in Ukraine but also in the rest of world³.

Since the conceptual theoretical provisions of forensic veterinary examination are currently in the process of formation, there is an urgent need for their development, and experimental and practical justification⁴. One of such directions is the doctrine of stages of the expert research and their application in forensic veterinary examination⁵.

Analysis of Essential Researches and Publications

International and national legislation accurately regulates the organization and conduct of forensic examination⁶. However, in Ukraine there are still no legally

- 1 Ключев О. М. Удосконалення експертного забезпечення правосуддя: теоретичні, правові та організаційні аспекти. *Теорія та практика судової експертизи і криміналістики*. 2019. Вип. 19. С. 102—117. DOI: 10.32353/khrife.1.2019.08 (date accessed: 08.09.2021) ; Яценко І. В., Дереча Л. М. Можливості судово-ветеринарної експертизи як нового виду судових експертиз. *Ibid.* С. 550—567. DOI: 10.32353/khrife.1.2019.044 (date accessed: 08.09.2021).
- 2 Mills G. Proving the crime: how veterinary forensics can help. *Veterinary record*. 2013. Vol. 172 (18). P. 465. DOI: 10.1136/vr.f2694 (date accessed: 08.09.2021).
- 3 Ottinger T., Rasmusson B., Segerstad C. H. A., Merck M., Goot F. V. D., Olsen L., Gavier-Widen D. Forensic veterinary pathology, today's situation and perspectives. *Ibid.* 2014. Vol. 175. Is. 18. P. 459. DOI: 10.1136/vr.102306 (date accessed: 08.09.2021).
- 4 Яценко І. В., Парилловський О. І. Новітні досягнення в судово-ветеринарній експертизі тварин, постраждалих від жорстокого поводження. *Науковий вісник Львівського національного університету ветеринарної медицини та біотехнологій ім. С. З. Гжицького. Серія: Ветеринарні науки*. 2020. Т. 22. № 97. С. 95—105. DOI: 10.32718/nvlvet9716 (date accessed: 08.09.2021).
- 5 Основи судової експертизи: навчальний посібник для фахівців, які мають намір отримати або підтвердити кваліфікацію судового експерта / авт.-уклад.: Л. М. Головченко, А. І. Лозовий, Е. Б. Сімакова-Єфремян та ін. Харків, 2016. 928 с.
- 6 Сімакова-Єфремян Е. Б. До питання взаємозалежності європейських інтеграційних процесів і тенденцій інтеграції спеціальних знань в Україні. *Теорія та практика судової експертизи і криміналістики*. 2017. Вип. 17. С. 152—158 ; Інструкція про призначення та проведення судових експертиз та експертних досліджень : затв. наказом Міністерства України від 08.10.1998 р. № 53/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 20.02.2022) ; Про судову експертизу : Закон України від 25.02.1994 р.

established regulated procedures for its conduct. In this regard, the development of all urgent issues of veterinary forensics is due to the need to properly classify the offenses committed against animal life and health, as well as the need of society for a fair trial ⁷.

Modern forensic veterinary examination is supplemented by the latest scientific research, which specialists are actively implementing and using in forensic science. Thus, new developments have enriched the theory and practice of forensic veterinary examination of live experimental animals ⁸, as well as the animal carcasses whose death were caused by cruel treatment or illegal hunting ⁹. In the research work "Development of guidelines for determining the severity of injuries to animals" (state registration number 0120U101976) of National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» developed rules for determining the severity of damage caused to the health of experimental animal; separately determined and substantiated forensic veterinary criteria and signs of harm to health, dangerous to the life of the animal; the order of forensic veterinary determination of the severity of

the damage caused to the animal's health is covered; forensic veterinary criteria of injuries penetrating into the body cavities of the animal are substantiated; forensic veterinary signs of moderate and mild damage to the animal's health are characterized. It is proved that individual fractures, dislocations and subluxations of individual bones of the animals' skeleton should be classified as serious injuries.

Another area of forensic veterinary examination is a forensic veterinary examination of animal carcasses ¹⁰. To eliminate gaps in this area of expert activity in the research work "Development of forensic veterinary examination's methods of animal carcasses" (state registration number 0121U100299) analyzed forensic cases of the examination of animal carcasses with signs of violent death from cruel treatment, developed and substantiated algorithms for forensic veterinary examination of animal carcasses with signs of violent death, clinical and morphological epicrisis of multimorbid animal pathology, the procedure for forensic veterinary examination of animal carcasses in the hall of a specialized expert institution, forensic veterinary determination of animals'

№ 4038-XII (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4038-12#Text> (date accessed: 20.02.2022) ; Brinkmann B. Harmonisation of Medico-Legal Autopsy Rules. *International Journal of Legal Medicine*. 1999. Vol. 113 (1). Pp. 1–14. DOI: 10.1007/s004140050271 (date accessed: 20.02.2022) ; Munro R., Ressel L., Gröne A., Hetzel U., Jensen H. E., Paciello O., Kippar A. European Forensic Veterinary Pathology Comes of Age. *Journal of Comparative Pathology*. 2020. Vol. 179. Pp. 83–88. DOI: 10.1016/j.jcpa.2020.08.003 (date accessed: 20.02.2022).

- 7 Brooks Brownlie H. W., Munro R. The Veterinary Forensic Necropsy: A Review of Procedures and Protocols. *Veterinary Pathology*. 2016. Vol. 53 (5). Pp. 919–928. DOI: 10.1177/0300985816655851 (date accessed: 20.02.2022) ; Brinkmann B. Op. cit.
- 8 Яценко І. В., Дереча Л. М., Париловський О. І. Новітні наукові й практичні здобутки та перспективи розвитку судово-ветеринарної експертизи живих тварин в Україні. *Актуальні питання та перспективи розвитку судової експертизи та криміналістики* : мат-ли Міжнар. наук.-практ. конф. (Одеса, 03.09.2021). Одеса, 2021. С. 368–373.
- 9 Яценко І., Дереча Л., Казанцев Р. Новейшие научные и практические достижения и перспективы развития судебно-ветеринарной экспертизы трупов животных в Украине. *Legea și Viața*. 2021. № 1. Vol. II. Pp. 94–99.
- 10 Mangematin G. Post-mortem examination in food-producing animals. Regulations and standards. *Point veterinaire*. 1999. Vol. 30 (203). Pp. 33–36.

poisoning with medicine containing cardiac glycosides, based on pathomorphological examination, the forensic veterinary examination and evaluation criteria for fatal gunshot wounds of animals.

As indicated above, the development of these and other issues of forensic veterinary examination is due to the need of law enforcement agencies in the correct classification of offenses against animal life and health, and society - in a fair trial¹¹. Expert research is the cognitive activity of a forensic expert - a complex creative process based on the latest advances in science and technology, awareness of modern effective research methods and expert skills¹².

During the forensic veterinary examination or expert research to perform a specific expert task, specialists use appropriate research methods and techniques, outline ways and means of its implementation, taking into account the stage of forensic veterinary examination¹³. Determining the method of examination belongs to the competence of the expert.

The specifics of the subject and objects of forensic veterinary examination determines the specifics of the study's stages. Operations that form separate stages of the expert research — the application of the laws of objective reality to acquire new knowledge¹⁴. Stages of forensic veterinary examination are formed on the basis of

the relevant tested expert procedures, the nature of qualities of the examination's object, the experience of solving practical expert tasks.

Adherence to the stages of forensic veterinary examination largely ensures the effectiveness, reliability and objectivity of the study's results, which is expressed in its effectiveness, legality, verification, etc.¹⁵.

The relevance of this work is primarily due to the lack of sufficient theoretical basis for forensic veterinary examination in the domestic scientific literature (systematic analysis and clear differentiation of stages of such examination) and the need to implement scientific developments in the expert practice of animal carcasses.

Objective of the work

To reveal the essence, functions and significance of the stages of expert research in forensic veterinary examination of animal carcasses.

Main Content Presentation

In the process of any expert research, including forensic veterinary, based on general guidelines, regardless of the tasks, it is advisable to distinguish four stages: *preparatory* (preliminary research),

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- 11 Benetato M. A., Reisman R., McCobb E. The veterinarian's role in animal cruelty cases. *Javma* : Journal of the American Veterinary Medical Association. 2011. Vol. 238. Is. 1. Pp. 31–34. DOI: 10.2460/javma.238.1.31 (date accessed: 20.02.2022).
 - 12 McDonough S. P., McEwen B. J. Veterinary Forensic Pathology: The Search for Truth. *Veterinary Pathology*. 2016. Vol. 53. Is. 5. Pp. 875–877. DOI: 10.1177/0300985816647450 (date accessed: 20.02.2022).
 - 13 Byard R. W., Boardman W. The potential role of forensic pathologists in veterinary forensic medicine. *Forensic science medicine and pathology*. 2011. Vol. 7. Is. 3. Pp. 231–232. DOI: 10.1007/s12024-011-9241-x (date accessed: 20.02.2022).
 - 14 Щербаківський М. Г. Проведення та використання судових експертиз у кримінальному провадженні : монографія. Харків, 2015. 560 с.
 - 15 Ottinger T., Rasmusson B., Segerstad C. H. A., Merck M., Goot F. V. D., Olsen L., Gavier-Widen D. Op. cit.

analytical (separate research), *comparative*, *synthesizing* (evaluation).

The phasing of the expert study reflects not only the procedure of expert knowledge of the properties of forensic veterinary examination objects, but also allows to trace the process of examination and evaluate the results obtained during the analysis of the expert conclusion. Each stage of expert examination of animal carcasses performs certain functions and provides solutions to intermediate tasks.

The division of the process of forensic veterinary examination into separate stages is due to various techniques, as well as those tasks that the specialist solves in the process of diagnostic forensic veterinary examination of the animal carcass¹⁶. The commonality of the stages reflects general points characteristic of any expert research as one of the varieties of forms of cognition. The variety lies in the part and number of same-named stages in the structure of diagnostic studies.

The sequence of application stages of expert research in forensic veterinary examination of animal carcasses makes it possible to logically explain the pathomorphological changes found in the animal carcass, and on the basis of their comprehensive assessment to formulate forensic veterinary diagnosis and final conclusions based on expert research¹⁷. During the forensic veterinary examination, the expert uses special methods and technical means to help identify hidden information in the object of study, which has probative value¹⁸. Consider in more detail the stages of

forensic veterinary examination of animal carcasses.

1. Preparatory stage of expert research

At the first, preparatory stage of expert research, the forensic veterinary expert gets acquainted with the document on appointment of examination, and also the objects (material and materialized) provided for examination. The main task of the expert at this stage is to find out the complete list of objects submitted for examination, to establish compliance of materials and objects received by the expert institution (expert) with the information specified in the procedural document on appointment of forensic veterinary examination, and to make the scheme of the decision of the tasks set before him. At this stage of examination, the expert solves certain tasks related to the study of the document on the appointment of forensic veterinary examination or the involvement of an expert; establishes the category of the case for which the forensic veterinary examination is assigned; studies the list of objects subject to forensic veterinary examination; finds out the method of delivery of the animal's carcass and other materials, the type of packaging (its nature and integrity), the name of the received documents and the number of sheets in them; checks the availability of information in the case file to identify the expert initiative. These data are extremely important for the choice of methods of forensic veterinary examination and evaluation of the results obtained during the examination. At this stage, the expert

16 Ribas L. M., Massad M. R., Pinto A. C., Heng H. G., Tremori T. M., Reis S. T., Baroni C. O., Massad E., Rocha N. S. Post-mortem CT vs necropsy in feline medicine. *Journal of Feline Medicine and Surgery*. 2020. Vol. 22. Is. 12. 1206–1213. DOI: 10.1177/1098612X20919310 (date accessed: 20.02.2022).

17 Mangematin G. Op. cit.

18 Parry N. M. A., Stoll A. The rise of veterinary forensics. *Forensic Science International*. 2020. Vol. 306. Art. 110069. DOI: 10.1016/j.forsciint.2019.110069 (date accessed: 02.05.2022).

finds out the subject of forensic veterinary examination, implemented in the tasks and fundamental for further examination, as well as the relationship of the object with the subject of forensic veterinary examination. After that, the forensic expert, if necessary, formulates a request for additional materials, information, samples; selects regulations, methods and sources of special literature, which will be used during the forensic veterinary examination and draws up a scheme of further examination.

Thus, at the preparatory stage of the expert examination, the expert forms a program of forensic veterinary examination of the animal's carcass, which regulates the content and procedure in sequence, which ensures the solution of a specific expert task.

2. Analytical stage of expert research (separate research)

At this stage, the expert conducts the examination of each object of forensic veterinary examination separately or individual components of one object (for example, describes in detail, removes, records, analyzes individual organs, parts of organs or parts of an animal carcass) that are important for binding of the set expert tasks.

The carcass of an animal provided for forensic veterinary examination is material evidence in the case. Carrying out its forensic veterinary examination is always accompanied by a violation of the anatomical integrity of tissues, organs, parts of the body. Therefore (according to pgh. 4.11 of the Instruction on the appointment and conduct of forensic examinations and expert research ¹⁹, hereinafter referred to as the *profile instruction*) in the procedural document

on appointment of forensic veterinary examination there should be the permission for application of destructive research methods; if such permission is not available in this document, the damage to the animal's carcass must be accompanied by the written consent of the authority or person who appointed the forensic veterinary examination or involved the expert.

Registration and anamnestic data, external and internal signs of an animal carcass, results of additional instrumental and laboratory examinations are subject to expert research (fig. 1).

Examining the registration and anamnestic data of the animal's carcass, establish: the location of the carcass before autopsy; its physique, consistency, fatness, the degree of cadaveric cooling and hardening, the severity of signs of decay; the condition of the visible part of the mucous membranes, hair, skin, oral and nasal cavities, available for external examination; condition of the eyes, auricles, neck, anus, external genitalia, thoracic and pelvic limbs, spine and head, assessing their development and integrity to the touch.

During the internal examination of the animal's carcass at the analytical stage of the expert examination pay attention to the condition of the subcutaneous fat layer, assess the condition of the cavities of the animal's carcass (presence of foreign odor, condition of serous membranes); humidity, relief, color, transparency, layers, adhesions, filling of blood vessels, hemorrhages and their localization; thickening, adhesions with organs).

In the head area, the organs of the oral cavity, nose, eyes, ears, soft tissues and bones, the brain and its membranes, lymph nodes, salivary glands, and

¹⁹ Інструкція про призначення та проведення судових експертиз ... URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 20.02.2022).

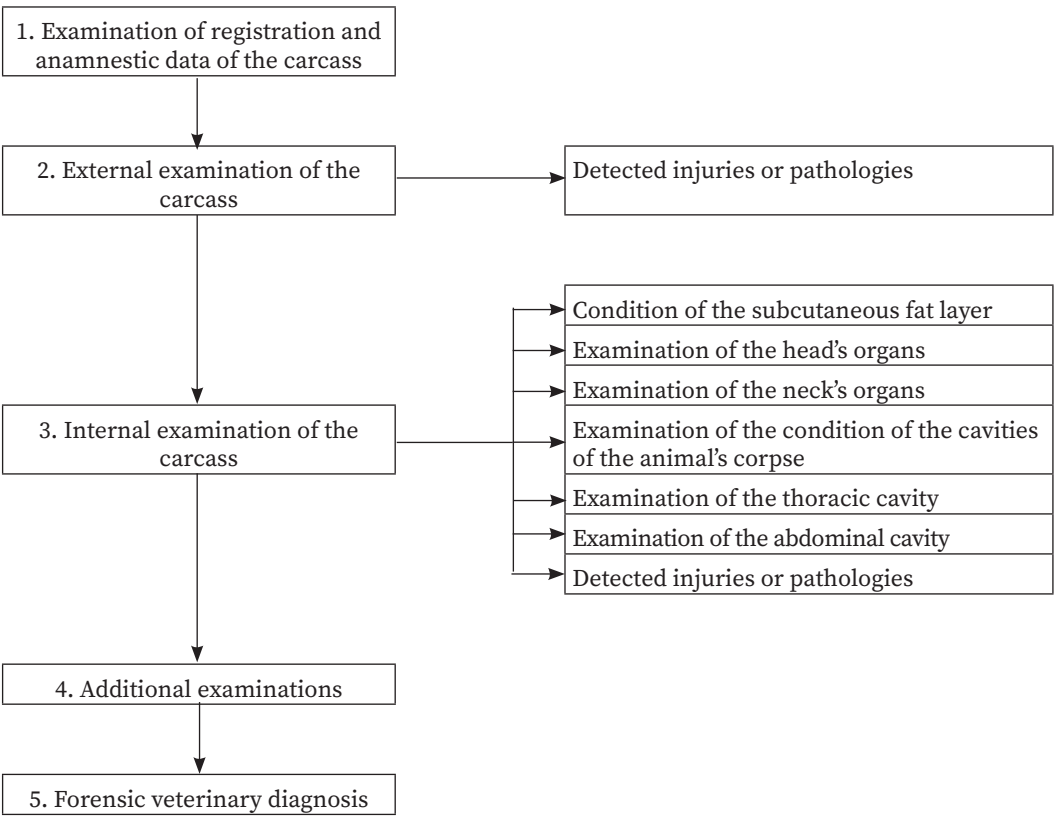


Fig. 1. Block diagram “Forensic veterinary examination of the animal’s carcass”

paranasal sinuses are subject to mandatory examination. In the neck area, soft tissues, cervical part of the esophagus and trachea, thyroid gland, cervical part of the thymus, large blood vessels (carotid arteries and jugular veins), vagosympathetic trunk are subject to mandatory examination.

Then conduct research on at least three cavities of the carcass — thoracic, abdominal, pelvic and cerebral, as well as organs located in them. In the thoracic cavity of the animal carcass must examine the pleura, heart with pericardial sac, large blood vessels, lungs, bronchi, thoracic trachea and esophagus, thoracic thymus.

In the abdominal cavity of the animal’s carcass examine the peritoneum, diaphragm, spleen, liver with gallbladder, pancreas, kidneys, adrenal glands, stomach, large omentum, intestines, in males (testicles with appendages, vas deferens and urethra), in females (ovaries, fallopian tubes, uterus, genitourinary sinus), large blood vessels. The forensic veterinary expert must pay attention to the position of the organs in the body cavities and the position of the dome of the diaphragm.

In addition, examining each organ separately, also assess its external

condition and the condition of the incision. Examination of parenchymal organs (lungs, liver, kidneys, spleen, pancreas, adrenal glands, thyroid gland, ovaries, testes, etc.) are carried out in the following order: 1) external signs — shape, color, consistency, size of the organ, linear dimensions, mass; and 2) internal signs — the state of the parenchyma during incision of the capsule; capsule condition; the condition of the body's tissues in section.

Examination of tubular organs (esophagus, larynx, trachea, stomach, intestines, bladder, fallopian tubes, vas deferens, uterus, etc.) are carried out similarly: first describe the external (shape, color, humidity, etc.) and internal signs (organ content, mucosal condition and muscle membranes, the degree of blood supply to the vessels of the organ wall).

Each organ removed from the above cavities of the animal's carcass shall be described in accordance with the procedure established in forensic veterinary practice. For example, the description of the heart contains the following parameters: anatomical position (anatomically natural or displaced); the pericardium is separated or not separated from the heart, anatomically intact or damaged; the contents of the pericardial cavity (absent, containing fluid (indicate the volume in cm³)); the nature of the contents (yellowish, red liquid, fibrin film); shape (conical or other); myocardial size (unchanged, slightly enlarged, markedly enlarged, reduced); weight (indicated in grams); dimensions (indicate linear indicators of length, width, thickness in centimeters); the apex of the heart (blunt, pointed); coronary arteries of the heart (tortuous or not tortuous, narrowed or not narrowed); epicard (shiny, dull; wet, dry; smooth, rough; without overlays

or with overlays of fibrin; without or with hemorrhages in the form of small hematomas, with hemorrhages of spotted appearance (Tarde's spots)); pericardial fat (well expressed, moderate, absent, contains infiltrates); left ventricular cavity (unchanged, dilated or thinned; contains liquid uncoagulated blood, red blood clots, white blood clots, mixed blood clots); left ventricular wall (unchanged, thickened, thinned); the cavity of the right ventricle (unchanged, dilated, thinned; contains liquid uncoagulated blood, contains red blood clots, contains white blood clots, contains mixed blood clots); the wall of the right ventricle (unchanged, thickened, thinned); the ratio of the chambers of the heart (defined as 2:1 or 3:1); blood in the chambers of the heart (sat evenly, did not sit down; settled more in the right or left ventricles; color of seats: red, purple, chocolate, white); endocardium (light gray, gray; smooth, rough; shiny, dull; no hemorrhage, spotted hemorrhage (Minakov's spots), expressed in the valves in the form of small hematomas); endocardiosis (severe or absent); myocardial color (red, dark red, light red, yellow-brown, brown, with white layers, grayish-red, gray, spotted gray); humidity (dry, wet); consistency (elastic, flabby, dense); crescent valves (thin, thickened, diffusely thickened; compacted, flabby; with or without sclerotic plaques; smooth, rough; transparent, translucent, matte); three-and two-leaf valves (thin, thickened, diffusely thickened; compacted, flabby; with or without sclerotic plaques; smooth, rough; transparent, translucent, matte); chordal threads (not changed, shortened, stretched, with unchanged thickness, thickened, thinned); aorta (diameter: unchanged, enlarged, narrowed); sclerotic plaques (pronounced or absent); transverse tears of the intima (expressed or absent); color (dark red or light red);

the surface of the inner shell (smooth or rough); the width of the vessels above the valves (indicate the width of the aorta and pulmonary artery in centimeters); large blood vessels (consistency of blood in them: liquid, red, white or mixed); intima surface (smooth or rough); transverse tears of the intima (expressed or absent); intimacy color (dark red or light red); damage (absent or detected: indicate the area and their nature).

As a result of a separate study, two sets of features are distinguished: *general* (without pathomorphological changes) and *individual* (with pathomorphological changes that characterize the organ or body part of the animal's carcass, to an extent sufficient for diagnostic purposes).

For example, in the case of mechanical asphyxia in a cat from the compression of the neck by a loop, the diagnostic signs are: single, open, unevenly indented, obliquely ascending strangulation furrow in the upper third of the neck, acute pulmonary emphysema, punctate hemorrhages in the conjunctiva and eyelids epicardium (Tarde's spots), plethora of internal organs, liquid blood. Diagnostic signs in the case of gunshot shroud blind penetrating injury of the left chest of the animal with damage to the left lung and heart: the entrance on the anterior surface of the left chest without signs of a close shot, the presence of pellet in the wound canals, left hemothorax, hemopericardium. For combined trauma in dogs, the diagnostic signs will be: penetrating stab-cut damage to the anterior surface of the chest on the left with damage to the right atrium and cranial lobe of the left lung; left hemothorax, hemopericardium. In the case of open traumatic brain

injury diagnostic signs are: fragmentary fracture of the left parietal bone with damage to the dura mater, subdural hematoma, subarachnoid hemorrhage there, hemorrhage into the soft tissues of the head, massive blood loss, anemia of internal organs, weak pronounced carcass spots.

At the stage of analytical forensic veterinary research, a set of methods is widely used²⁰: in particular, *general* – dialectical and logic (abstraction, analysis, induction, idealization, formalization, etc.), observation, measurement, description, hypothesis construction, planning, experiment, modeling, program-mathematical, etc.; *separate* (instrumental and auxiliary technical) – forensic photography and microphotography, radiological diagnostics, hematological and microbiological, microscopy, mass spectroscopy, etc.); *special* – the functions of which are performed by specialized (specific) methods of solving specific expert tasks.

At the analytical stage of forensic veterinary examination of the animal carcass, the expert also uses various technical means: as *simple devices* (measuring ruler (in particular, metal), magnifier, microscopes for various functional purposes, scales, ultraviolet and infrared light source, camera, tape measure, measuring cylinders for determining the amount of liquid, scales for weighing organs, glasses made of ordinary glass for eye protection) and *tools* (large sectional knives; dissecting knives such as surgical abdominal scalpels; cartilaginous and cerebral knives; scissors: intestinal and button, with pointed ends (dissecting) for opening small blood vessels and ducts;

20 Яценко І., Сімакова-Єфремян Е., Дереча Л. Методи судової експертизи та їх застосування у судово-ветеринарних дослідженнях. [Forensic expertise methods and their application in forensic veterinary research] *Теорія та практика судової експертизи і криміналістики*. 2021. Вип. 2 (24). С. 52–76. DOI: 10.32353/khrife.2.2021.04 (date accessed: 20.02.2022).

knives: sectional, costal, bone, coopers, cerebral intestinal, bent at an angle (for blood vessels and canals) and button; bone forceps; hammer with blade; saws: bucksaw, double (from two parallel cloths for opening of the spinal canal at carcasses of small animals), sheet for deep cuts of bones, double; chisel; scalpels, tweezers: toothed and anatomical; probes (button and grooved); chisel; rickets — a chisel for opening the spinal canal; hammers (steel and wooden); clamps for fixing the bones extracted from the carcass during their sawing; spoons of different sizes to drain the fluid from the cavities of the carcass; two-toothed hooks; injection syringes; trepan; vise for fixing a detached head and bones; ditches; this one; sideburns; glassware for pathological material, glass bottles) and *sophisticated analytical equipment* X-ray machine, apparatus for ultrasonographic examination, devices for spectral analysis, mass spectrometers, chromatographic analyzers, biochemical blood analyzer, microscopes, etc.). At this stage, the expert uses the methods and means of forensic veterinary examination not only to identify signs, but also to record them.

In the process of forensic veterinary autopsy of the animal's carcass, the expert removes pieces of individual organs, tissues, biological fluids for additional instrumental and laboratory tests (including forensic toxicology, forensic chemistry, forensic histology, forensic immunology, microbiological, parasitological, forensic, etc.). Sometimes it is necessary to conduct instrumental radiological and other visualization methods of examination of the carcass ²¹.

Various foreign inclusions in the animal's carcass (particles of metal, glass, wood, mineral oils, soot, grains of gunpowder (in case of gunshot wounds), dirt, etc.) can get into the areas of damage from the contact surface of the weapon. Their detection in the areas of damage contributes to the specification of expert conclusions on injuries and the mechanism of action of traumatic weapons. Thus, traces of metals in the area of damage can be detected using color prints, color chemical reactions and spectral emission analysis.

Additional methods of forensic veterinary examination can detect glass fragments, which may indicate injury to the glass or the tool that contains it (in particular, the relevant parts of vehicles). For this purpose, the method of direct microscopy (magnification 8–12 ×), radiography in soft rays, centrifugation of washes with distilled water of the damaged area with simultaneous scraping with a scalpel, color test with cresol red, and stereomicroscopy are used.

When inspecting the area of damage with the naked eye or during stereomicroscopy, you can see such foreign inclusions as wood particles, soot, gunpowder grains, and so on.

Mineral oils in the area of damage can be detected in the case of traffic injuries (e.g., traces of lubricants), gunshot wounds (gunpowder and sediment in the area of the inlet). They detect them by the characteristic luminescence in ultraviolet rays. Gas-liquid chromatography is a highly sensitive and accurate method of detecting and differentiating different mineral oils.

21 Grela M., Listos, P., Gryzinska M., Chagowski W., Buszewicz G., Teresinski G. (2018). Imaging techniques as a method of sectional examination in forensic veterinary medicine. *Medycyna weterynaryjna*. 2018. Vol. 74. Is. 12. Pp. 751–758. DOI: 10.21521/mw.6005 (date accessed: 20.02.2022).

Sooty shot can be detected by photographing the object in infrared rays on special photographic plates and films. Since smokeless soot contains mostly metals of copper, lead, antimony, tin, iron, the method of color prints, as well as emission spectral analysis are used to detect them.

Soot and gunpowder grains can be detected during histological examination of the area of the inlet on the body skin and the walls of the wound canal. The grains of smokeless powder in the histological preparation have the form of translucent fibrous masses of greenish-gray or yellowish-gray color, round, oval or elongated shape with clear contours, but can also be in the form of small shapeless particles. Gunpowder grains are black particles.

Often the special knowledge and professional competencies of a forensic veterinary expert are not enough to solve some expert tasks, so a comprehensive examination is prescribed — for example, forensic veterinary and forensic ballistic examinations, forensic veterinary and forensic biological examinations, etc.

Based on the analysis of each detected pathomorphological feature of the animal carcass, the forensic veterinary expert identifies a set of specific pathognomonic features and decides on their suitability for solving diagnostic expert tasks.

During a comprehensive examination²² of animal cruelty (for example, forensic veterinary and forensic ballistic) the choice of general research methodology is complicated: because the techniques used by forensic veterinary experts should

not prevent the study of the same object (animal carcass) to an expert of another profile — for example, a ballistic expert.

After the forensic veterinary examination of objects (animal carcasses or their fragments) received by the expert institution, examination of case materials (rulings, court rulings) and questions referred to the expert, the forensic veterinary expert puts forward expert versions. The expert version (hypothesis) is a reasonable assumption of the expert about the properties and condition of the provided objects (animal carcasses or their remains), the final and intermediate circumstances to be established during the forensic veterinary examination. Expert versions can be general, i.e. to solve the problem in general (for example, determining the cause of death of the animal) and individual, which solve intermediate expert tasks (for example, to determine the nature of fatal injuries, their location, survival or mortality, mechanism, sequence, age of infliction, severity of injuries found in the carcass of the animal, the characteristics of the animal's carcass, which can establish the nature and characteristics of weapons or other weapons, which caused injuries, etc.).

Expert versions put forward various causes of the animal death, in particular the category of death (violent — from the effects of certain actions or circumstances on the body, when this effect causes a condition incompatible with life²³, or nonviolent death — death from exposure to pathogenic factors, the occurrence of which is not associated with acts of violence²⁴), childbirth (natural; sudden —

22 Сімакова-Єфремян Е. Б. Теоретико-правові та методологічні засади комплексних судово-експертних досліджень : дис. ... д-ра юрид. наук. Харків, 2017. 503 с.

23 Beirne P. For a nonspeciesist criminology: Animal abuse as an object of study. *Criminology*. 2006. Vol. 37. Is. 1. Pp. 117—148. DOI: 10.1111/j.1745-9125.1999.tb00481.x (date accessed: 20.02.2022).

24 Piegari G., Cardillo L., Alfano F., Vangone L., Iovane V., Fusco G.. Pathological, Bacteriological and Virological Findings in Sudden and Unexpected Deaths in Young Dogs. *Animals*. 2020. Vol. 10. Is. 7. P. 1134. DOI: 10.3390/ani10071134 (date accessed: 20.02.2022).

death without clinical signs of disease, which occurs unexpectedly, suddenly in a clinically healthy body; accident – death due to injuries caused unintentionally, as well as a result of natural disasters, accidents and catastrophes, both natural and man-made character ²⁵), types of death (from mechanical injuries ²⁶, from mechanical asphyxia ²⁷, from changes in barometric pressure ²⁸, from high or low temperature ²⁹, from electricity ³⁰, from radiant energy ³¹, from poisoning ³²).

Expert versions can also be put forward regarding the age of death of the animal, death at the scene, movement of the carcass in space after death ³³, survival or postmortem occurrence, mechanism, sequence, age of bodily injury found in the carcass; the nature and features of weapons or other weapons that have caused bodily harm on the characteristics of the carcass, etc. ³⁴.

Without the design, development, verification, refinement, final acceptance of the expert version until the transition from the hypothesis (assumption) to a reliable, truthful conclusion, the solution of problems in forensic veterinary examination is impossible. You should submit at least two versions. For example, when solving a diagnostic expert task, the *first version* – the damage occurred from the fall of an animal from a height, the *second version* – the damage is the result of a collision with a moving vehicle; the detected wound hole on the carcass was formed by the action of a prickly object or by the action of a high-velocity kinetic projectile, which could be a bullet.

At this stage, the forensic veterinary expert plans the sequence of forensic veterinary examination of the animal's carcass, taking into account the proposed expert versions: draws up

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- 25 Rowden P., Steinhardt D., Sheehan M. Road crashes involving animals in Australia. *Accident Analysis and Prevention*. 2008. Vol. 40. Is. 6. Pp. 1865–1871. DOI: 10.1016/j.aap.2008.08.002 (date accessed: 20.02.2022).
- 26 Ressel L., Hetzel U., Ricci E. Blunt Force Trauma in Veterinary Forensic Pathology. *Veterinary Pathology*. 2016. Vol. 53. Is. 5. Pp. 941–961. DOI: 10.1177/0300985816653988 (date accessed: 20.02.2022).
- 27 McEwen B. J. Nondrowning Asphyxia in Veterinary Forensic Pathology: Suffocation, Strangulation, and Mechanical Asphyxia. *Ibid.* Pp. 1037–1048. DOI: 10.1177/0300985816643370 (date accessed: 20.02.2022).
- 28 Bruchim Y., Loeb E., Saragusty J., Aroch I. Pathological Findings in Dogs with Fatal Heatstroke. *Journal of Comparative Pathology*. 2009. Vol. 140. Is. 2–3. Pp. 97–104. DOI: 10.1016/j.jcpa.2008.07.011 (date accessed: 20.02.2022).
- 29 Gwaltney-Brant S. M. Veterinary Forensic Toxicology. *Veterinary Pathology*. 2016. Vol. 53. Is. 5. Pp. 1067–1077. DOI: 10.1177/0300985816641994 (date accessed: 20.02.2022).
- 30 Touroo R., Fitch A. Identification, Collection, and Preservation of Veterinary Forensic Evidence: On Scene and During the Postmortem Examination. *Ibid.* Pp. 880–887. DOI: 10.1177/0300985816641175 (date accessed: 20.02.2022).
- 31 Siqueira A. de, Cassiano F. C., Landi M. F. D., Marlet E. F., Maiorka P. C. Non-accidental injuries found in necropsies of domestic cats: a review of 191 cases. *Journal of Feline Medicine and Surgery*. 2012. Vol. 14. Is. 10. Pp. 723–728. DOI: 10.1177/1098612X12451374 (date accessed: 20.02.2022).
- 32 Gwaltney-Brant S. M. Op. cit. DOI: 10.1177/0300985816641994 (date accessed: 20.02.2022).
- 33 Touroo R., Fitch A. Op. cit. DOI: 10.1177/0300985816641175 (date accessed: 20.02.2022).
- 34 Siqueira A. de, Cassiano F. C., Landi M. F. D., Marlet E. F., Maiorka P. C. Op. cit. DOI: 10.1177/1098612X12451374 (date accessed: 20.02.2022).

a work plan, outlines the scope and nature of the examination, selects the necessary methodology, containing methods, techniques and tools terms of the beginning and the end of forensic veterinary examination.

When choosing a method, it is necessary to take into account the requirements for the methods of forensic veterinary examination, in particular: scientific validity and reliability; approbation, obviousness and clarity of the results of application of these methods for all participants of the process; adherence to moral and ethical principles and efficiency; verifiability and security; simplicity and accessibility; relevance and universality; admissibility and maximum preservation of research objects.

Expert tasks are solved in three ways: *algorithmic*, *heuristic*, and *mixed* (combination of the previous two).

The algorithmic way in forensic veterinary examination is suitable for standard and typical expert tasks that involve the use of standard solutions, and is typical for solving typical issues related to the objects most common in forensic veterinary examination (in particular, animal carcasses).

An example of such a typical technique is the method of forensic veterinary autopsy to determine the cause of death. The carcass of the animal is to be examined. During the forensic veterinary autopsy, it was established that specific pathomorphological features that characterize the changes in the animal's body that are incompatible with life are the gross anatomical destruction of the skull bones and the substance of the brain. This uses the macroscopic method of analysis. The pathomorphological changes found in the carcass together allow to determine the location, nature, sequence of injuries

and the mechanism of their infliction, as a result – to answer the question posed in the document on the appointment of forensic veterinary examination.

Ways to solve non-standard expert tasks, which are not described in the standard expert methods, the expert develops independently during the implementation of a specific forensic veterinary examination. When setting such tasks, the heuristic technique is predicted by the specialist at the preparatory stage of the examination.

The choice of the method of solving the diagnostic forensic veterinary task is determined by the nature and peculiarity of the objects provided for forensic veterinary examination. Objects (animal carcasses), as well as the initial data that are the basis for diagnosis, can be different informative (*sufficiently informative* – with a wide field of information features, *informative* – with a sufficient field of information features, *uninformative* – with a narrow field of information features, *non-informative* – in the absence of information signs).

Upon completion of the analytical examination, the forensic veterinary expert concludes that the set of symptoms is sufficient or insufficient to make a forensic veterinary diagnosis. The conclusions made at the analytical stage are supplemented by the specialist in comparative and synthesizing examinations.

At the analytical stage of forensic veterinary examination of the animal's carcass during the solution of the diagnostic expert task, the expert experiment is not used.

Analysis and synthesis of features obtained as a result of analytical (separate) research allows for a full comparative examination.

3. Comparative stage of expert research

The main task of this stage is to compare, determine the coincidences or discrepancies found during a separate examination of the complexes of features of the studied objects, and if there are differences — to establish their cause and determine whether they are natural and significant or accidental.

Analytical and comparative research are interdependent. The comparison procedure is carried out on the basis of the features established during a separate examination of the animal carcass. For its part, the task, the object and the direction of the separate study are entirely determined by the purpose of this stage: the preparation of a comparative examination. The properties and signs (pathomorphological changes) of the object (animal carcass) isolated and examined at the analytical stage are compared with the well-known normal structure of organs and tissues.

Comparative research during diagnostic forensic veterinary examination has its own specifics. First, by comparing the normal structure of an organ or tissue and the pathologically altered structure of those organs and tissues. Secondly, to make a forensic veterinary diagnosis based on the results of the study of the animal's carcass is possible only as a result of a comparative research of a set of diagnostic specific (pathognomonic) signs.

At this stage, the method of comparison prevails. When comparing objects based on the results of quantitative determination of the composition and structure of their material, methods of mathematical statistics of measurement results are used. This stage is completed by establishing the coincidences and

differences of the features of the compared objects.

After analyzing all the results of the examination (forensic veterinary autopsy, instrumental and laboratory additional research), regardless of the tasks to be solved during the forensic veterinary examination, the expert formulates a forensic veterinary diagnosis. Summarizing the theoretical data of the scientific literature, our own research and many years of practical experience, we propose to define a *forensic veterinary diagnosis* as a conclusion formulated by a forensic veterinary expert based on a comprehensive examination of an animal carcass on the nature of the essence of the disease and / or trauma, reflecting the nosology, etiology, pathogenesis and mechanism of such disease and / or injury (according to veterinary terminology).

The formulation and construction of the forensic veterinary diagnosis makes it possible to summarize the main and important points identified during the examination of an animal carcass, shows the relationship between the cause of death and injury, or poisoning, or disease, and further facilitates the preparation of substantiated expert conclusions based on the results of forensic veterinary examination of the animal's carcass with signs of violent or sudden death.

The logical and consistent formulation of the forensic veterinary diagnosis testifies to the high professional level of the forensic veterinary expert and helps to compare the results of lifelong clinical examination of the animal with the results of forensic veterinary examination of the carcass in case of death.

Forensic veterinary diagnosis allows the person who appointed the examination, as well as the court to better accept the conclusions, to obtain a complete picture

of the nature of the injuries or diseases that led to the death of the animal and established during the forensic autopsy of the carcass. The diagnosis helps more precisely formulate the cause of death and justify it, structure the descriptive part and facilitate the expert's conclusion.

Forensic veterinary diagnosis is morphological. It is based on morphological detection of pathological processes. The main task of the forensic veterinary expert is to determine the main and immediate cause of the animal death. A necessary condition for this is the obligatory etiopathogenetic connection between the detected pathomorphological changes of the animal (in case of bodily injuries or diseases) and its death, which are reflected in the forensic veterinary diagnosis.

For forensic veterinary diagnosis, its three-member, rubricized structure is generally accepted. *Headings of forensic veterinary diagnosis* its sections for fixing the main injury or disease, complication of the main injury or disease, combined, concomitant and background injuries or diseases in the form of nosological units. *Nosological unit* — a specific disease or injury, poisoning or condition, identified on the basis of established etiology, pathogenesis and / or mechanism as a set of features identified by clinical, laboratory and instrumental methods that allow to identify disease, injury or poisoning.

The main injury or disease is the nosological unit with the most pronounced manifestations, which caused death of the animal (for example, compression of the brain by a growing hematoma, for traumatic brain injury). The main nosological unit of a disease, injury, poisoning or condition can by itself (without development complications) lead

to death, as well as become both primary and immediate cause of death. Such nosological units are considered primarily: mechanical trauma, incompatible with life (for example, traumatic separation of the head from the torso, gross destruction of the brain, etc.), acute poisoning by toxic substances (e.g., potent pharmaceutical substances, etc.), various types of mechanical asphyxia loop, etc.), electric shock (for example, lightning or industrial electricity), the action of extreme temperatures (e.g., general hypothermia, and so on), etc.

Complications of the main injury or disease are nosological units, more often symptoms and syndromes, which are directly or indirectly related to the main injury or disease, but are not its detection. Complications of the main injury or disease are the closest ones that occurred immediately after the injury or at the beginning of the disease (for example, heavy blood loss, embolism, etc.); distant, developed in the late period of illness or injury (for example, pneumonia, sepsis, peritonitis, etc.); the main ones that are leading in the development of injury or illness and have become decisive in the onset of death of the animal. The main complication is the cause of death.

Concomitant injury or disease is one or more nosological units directly related to the underlying disease or injury and involved in the mechanism of death. They can be formed both before and after the main injury or disease and are not directly causally related to the onset of death.

Competing injuries or diseases are nosological forms that the animal has suffered from during its lifetime, and each of them individually, by itself or due to its complications, could lead to death. Examples of such diseases are any serious fatal illnesses and injuries that coincide

in time in one sick animal (for example: severe traumatic brain injury with bruising of the brain and stab wounds with signs of massive blood loss; incompatible with life cerebral infarction and myocardial infarction, severe traumatic brain injury and stab wound with damage to a large blood vessel, etc.).

Combined injuries or diseases are those in which a dead animal has suffered at the same time and which, by mutually aggravating each other, have resulted in death, each of which has not been fatal (e.g., fracture of several ribs and chronic obstructive pulmonary disease with respiratory failure). It is important to note that competing or combined diseases are nosological forms that occur simultaneously and not sequentially.

Background injury or disease is one that is not etiologically related to the underlying injury or disease, but pathogenetically significantly exacerbates the underlying disease (e.g., adverse trauma in animals with severe diabetes mellitus: diabetes mellitus often causes secondary immune deficiency, becomes a background disease for many infectious diseases).

The immediate cause of death is an injury or illness or its complications, which became the final manifestation in a chain of pathological processes that directly caused the death of the animal (e.g., gross destruction of the animal's body, vital organs, etc.), or nearby complications (e.g., significant blood loss, embolism, etc.), or distant complications (e.g., pneumonia, sepsis, peritonitis, etc.).

Forensic veterinary diagnosis is formed concisely, clearly, completely, accurately, with the formulation of pathomorphological changes arranged in a logical sequence, taking into account the pathogenetic principle, with the

definition of the underlying disease and the processes that accompany it, which is the basis of expert conclusion.

Forensic veterinary diagnosis confirms, clarifies or expands the clinical diagnosis (in case of death of the animal during treatment). Diagnosis is not a conclusion, it only contributes to the correct, consistent and reasonable drawing of conclusions. If the results of laboratory tests are necessary for the formulation of the diagnosis, it is made out after their receipt.

The wording of the forensic veterinary diagnosis is unregulated. The diagnosis does not explain or substantiate anything, but it must be complete, i.e., it must contain all pathomorphological changes or injuries detected by the forensic veterinarian during the autopsy of the animal. In this case, homogeneous injuries, diseases or conditions combine.

Forensic veterinary diagnosis is based on nosological and pathogenetic principles, reflecting the sequence of development of the detected changes. The most important are its components – the main disease (injury), its complications, concomitant and background diseases or injuries.

Sometimes the forensic veterinarian cannot prove and explain the cause of the animal's death. In this case, he declares the impossibility of establishing the cause of death and states why (for example, due to severe signs of decay of the carcass or its skeleton, etc.).

On the basis of special veterinary knowledge, the expert must analyze the results of intermediate expert studies and give an expert assessment. To do this, it is necessary to move to the next stage, which is the evaluation of research results, summarizing their results and formulating conclusions.

4. Synthesizing stage (evaluation stage of the expert research)

The final stage of expert research is the most responsible for forensic veterinary examination, because the expert gives the final conclusion and determines the weight of all signs identified at the analytical stage of diagnostic research, their diagnostic informativeness, identified in the comparative study, forms an intermediate expert opinion on the results. research. The synthesizing stage of expert research completes the process of forensic veterinary examination, and its content is the generalization and aggregate expert evaluation of the results of individual studies, based on methods of formal logic (analysis, synthesis, deduction, induction) and their inner convictions, which are the basis for conclusions³⁵. The results of this stage are presented in the synthesizing section of the research part of the expert's opinion, so it is also called synthesizing.

Expert evaluation at the stage of synthesis is characterized by the following features:

- it is final, determines the necessary (minimum) and sufficient (maximum) basis for the expert's conclusion, which determines its form and content;
- concerns a set of pathomorphological changes in the animal's carcass, and not individual features detected at the stage of separate examination in individual organs, tissues or parts of the body;
- the expert evaluates not individual identified pathological changes

in organs and tissues, but their totality, given the informativeness of each, i.e. has an integrative nature.

In contrast to the evaluation of individual pathomorphological features found in the animal's carcass to solve intermediate tasks at individual stages of expert research, expert evaluation in the final stage covers the whole set of established pathognomonic changes detected in the animal carcass, the results of additional instrumental and laboratory studies, results research of case materials: it is carried out to solve the tasks set in the document on the appointment of forensic veterinary examination.

The pathomorphological signs found in the animal's carcass are evaluated in the following sequence: 1) the main injury or disease that led to the death of the animal; 2) complications of the main injury or disease; 3) competing, concomitant and background injuries or diseases.

Evaluation should begin with an indication of the species of the experimental animal's carcass; sex, age and physiological characteristics; analysis of the revealed pathomorphological pathognomonic changes in organs and tissues, which became the basis for forensic veterinary diagnosis. Expert assessment of these changes involves a scientific explanation of their nature: the specialist notes the identified injuries, their location, survival or mortality, sequence, pathogenetic mechanisms of occurrence (infliction), the nature of the injury that could have caused the injury, cause and effect between injury and death

35 Осипенко І. П., Пророченко В. В. Висновок експерта в досудовому розслідуванні. *Юридичний науковий електронний журнал*. 2020. № 2. С. 339—402. DOI: 10.32782/2524-0374/2020-2/104 (date accessed: 20.02.2022).

of the animal. For this purpose, the information reflected in case materials and belongs to a subject of research acquires special value.

At the stage of evaluating the results of forensic veterinary examination of an animal carcass in forensic veterinary examination it is advisable to apply objective conditions (criteria) of evaluation. For example, in diagnostic researches of visible mucous membranes consider: integrity (not broken, broken – mark a site); color (pale pink, pale gray, pale, jaundiced, cyanotic, pigmented); humidity (expressed well, moderately, absent); inflammation (absent, catarrhal, purulent, purulent-catarrhal, hemorrhagic); damages (absent, registered – indicate the area of distribution and their nature); the presence on the surface of mucus, erosions, ulcers, exudate (fibrinous, purulent, etc.), as well as hemorrhage, atrophy (thinning) or hypertrophy (thickening). There are criteria for describing other organs and parts of the body.

To automate the registration and analysis of individual pathomorphological features of the animal's carcass, you can use computer programs, in particular, developed by us information and expert system "Forensic Veterinary Section".

At the stage of expert evaluation of the results of diagnostic forensic veterinary examination of the animal's corpse and the formation of conclusions, when there is a transition from hypothesis to reliable judgment, the specialist survival or post-mortem infliction, time of injury, causal relationship between the nature of the injury and the death of the animal, the rate of death of the animal after injury, the animal's pain and suffering from the damage. The explanation of the existing

deviations (variability) of the situation (for example, background and concomitant diseases or injuries), which do not affect the reliability of the diagnostic conclusion, should be provided here.

An important question to be answered by a forensic veterinarian is the time of infliction of fatal injury to the animal. If in the course of the forensic veterinary examination a sufficient number of pathomorphological signs characterizing the age of the animal's death is established, the expert has the right to state that the death of the examined animal occurred at the time and under the circumstances specified in the forensic veterinary examination.

In order to confirm the objectivity of the expert's conclusion based on the results of the forensic veterinary examination and substantiate the obtained results, the expert must indicate in the conclusion that there is a direct necessary causal link between the animal's injuries and death.

When deciding whether an animal has experienced pain and suffering from injuries, the forensic veterinary expert should consider the nature and number of injuries, their location, take into account the vital importance of the damaged organ or body part, and so on. Thus, in the case of causing non-life-threatening damage to an animal, when death could occur instantly, the expert first notes that the death of such an animal occurred fairly quickly (immediately), immediately after the injury, so the animal felt pain for a short time. In the case of infliction of non-life-threatening injury to an animal, when the death did not occur immediately after its injury, the expert notes that before death the animal felt pain and suffered from bodily injuries.

In the final part of the conclusion, the expert provides information on exactly how, for what reasons and in what sequence the changes related to the event of the crime took place.

When solving diagnostic expert tasks, the stage of expert evaluation is characterized by a variation of alternatives, the choice of one, the most reliable set of informative features. In particular, among the set of pathomorphological features found in an animal carcass, the most informative are pathognomonic for a particular injury or disease.

Drawing conclusions based on the results of forensic veterinary examination is a mental process that takes place in stages. The forensic veterinary expert, based on the laws and techniques of logical thinking, can return to the results of the analytical and comparative stages of the examination, their course, refer to the case file. Forensic veterinary examination is characterized by the consistent accumulation of separate, intermediate conclusions, from which follow the final conclusions, which become the answer to the questions posed in the document on the appointment of forensic veterinary examination.

“Conclusions” is the most responsible section of the final part of the expert's conclusion, which is the result of the examination of the animal's carcass, the point of the final part of the autopsy report, which concluded the cause of death, location and nature of injuries, survival or mortality, sequence of infliction, mechanism of formation, causal relationship between the nature of the injuries and the death of the

animal, ascertaining whether the animal experienced pain and suffering before death, etc. If the cause of death was a disease, then indicate the underlying disease or injury, its complications, competing, comorbid and background diseases.

“Conclusions” must be complete, motivated, scientifically sound, consistently stated, clear, specific, expressive, understandable, based on factual data, avoid repetition, overload with special veterinary terms.

In the final part (results) the expert gives full and substantiated answers to the questions posed to him, set out in the court decision or resolution of the person who appointed the examination or involved a forensic veterinary expert. It is allowed to combine similar questions and change their sequence without changing the wording of the question. In the final part of the opinion, the expert may also indicate the answers to questions that the investigator did not ask, but which, in the opinion of the forensic veterinary expert, are important for the investigation (expert initiative).

At the stage of evaluation of the examination concentrated professional knowledge, practical experience of the forensic veterinary expert in the field of veterinary medicine and biology, his ability to recognize patterns of diseases or injuries identified in the carcass of an animal, on the basis of which the specialist formulates a forensic diagnosis — provides answers to the questions posed in the document on the appointment of forensic veterinary examination³⁶.

36 Мелех Л. В. Оцінка доказів як заключний етап процесу доказування. *Вісник Луганського державного університету внутрішніх справ імені Е. О. Дідоренка*. 2015. Т. 1. № 69. С. 132—142.

The inner conviction of the expert is the state of his consciousness, which reflects the result of mental subjective activity in the process of examination of expert assessment of factual data on a particular examination, the result of which is reflected in the expert's conclusion. Such defining features of the definition of "internal conviction of the expert" reveal its content and significance in forensic expertise, take into account the latest conditions of forensic activity, as well as state confidence in the correctness of the conclusion, i.e., compliance with reality, truthfulness, infallibility, many factors. First of all, it is based on the results of forensic autopsy of the animal's carcass, additional laboratory and instrumental studies of the material removed from the carcass and, if necessary, the study of case materials.

The expert analyzes the entire technological process of forensic veterinary examination of the animal's carcass, illustrations of the general appearance of the carcass or its individual organs and parts of the body, as well as pathognomonic changes in organs and tissues directly related to bodily injury or illness, show how clear and convincing they are for perception by a person, who appointed the forensic veterinary examination or involved a forensic veterinary expert, as well as other participants in the process, and to what extent they confirm the validity of the formulated conclusions.

Requirements for the cognitive and evaluative judgment of the forensic veterinary expert are presented in Fig. 2.

Requirements for the cognitive and evaluative judgment of the forensic veterinary expert

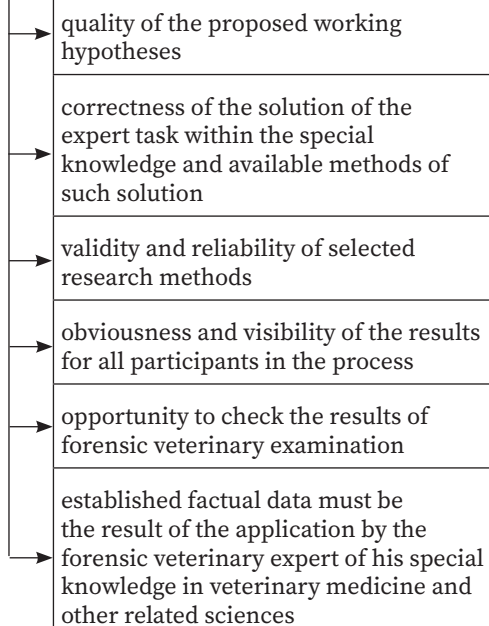


Fig. 2. Block diagram "Requirements for the cognitive and evaluative judgment of the forensic veterinary expert"

The formulation of conclusions takes place on two conditional levels: intermediate and final. During the forensic veterinary examination of the animal's carcass, the expert makes certain judgments about the nature of pathomorphological changes, their number, location, severity, and so on. These judgments are an intermediate conclusion³⁷. After conducting a full set of expert examination (forensic veterinary autopsy, as well as additional laboratory and instrumental studies), the expert

37 Listos P., Gryzinska M., Kowalczyk M. Analysis of cases of forensic veterinary opinions produced in a research and teaching unit. *Journal of Forensic and Legal Medicine*. 2015. Vol. 36. Pp. 84–89. DOI: 10.1016/j.jflm.2015.08.002 (date accessed: 20.02.2022).

forms a general opinion (judgment) on the cause of death, location and nature of injuries, survival or postmortem formation, sequence of tasks, mechanism of formation, causal relationship between the nature of injuries and death of the animal, etc. The final nature of the assessment at the stage of synthesizing research is that it provides a basis for formulating a final expert conclusion.

In the case of a commission or comprehensive examination, the conclusion is formed according to the general rules set out in the profile Instructions, taking into account the following features:

- experts involved in conducting a comprehensive examination must have the professional knowledge necessary and sufficient to be well versed in the methodology and conclusions of other experts and to determine their significance for the overall conclusion. They should also be familiar with the method of joint implementation of a comprehensive examination, because only the interaction contributes to the integration of specialized knowledge necessary and sufficient for a comprehensive forensic veterinary examination and the formation of a joint conclusion of experts. To formulate and substantiate such a conclusion, the knowledge of one or more members of the expert commission is not enough (unlike the commission examination);
- to organize a joint research program, appoint the head of the experts (from forensic experts involved in conducting

a comprehensive forensic examination);

- research conducted by individual experts describe in the relevant sections of the examination part of the expert conclusions which are signed by these experts, indicating their names and initials;
- generalization and expert evaluation of examination results are recorded in the synthesizing section of the research part of the expert conclusion, where each expert signs exactly the part that is the result of his research;
- experts involved in conducting a comprehensive examination should discuss and analyze the results of each research conducted to formulate a joint conclusion on the issues raised by the experts in the document on the appointment of a commission examination;
- if at least one expert in the complex examination has doubts about the conclusion of the other experts of this composition, he cannot individually formulate and provide the final conclusion of the experts. Such an expert may sign only the individual interim conclusions provided by him or provide a separate opinion describing the course and results of research conducted by him personally.

Thus, for the formation of the final expert conclusion is a necessary condition: in particular, the expert examination must comply with the principles of legality of the expert procedure, independence and competence of the forensic expert, scientific validity, completeness, comprehensiveness, verification,

use of all means and methods of the examination³⁸.

To solve the diagnostic expert task, the established set of features, which contains pathomorphological changes found in the animal's carcass, and the results of additional laboratory and instrumental research, which give the expert grounds to answer the questions posed in the document on the appointment of forensic veterinary examination, are sufficient³⁹.

Conclusions

In the process of any expert research, in particular forensic veterinary examination of animal carcasses, based on general methodological provisions, regardless of the tasks, there are four stages: preparatory (preliminary research), analytical (separate research), comparative, synthesizing (evaluation).

The phasing of the expert research reflects not only the procedure of knowledge of the properties of the forensic veterinary examination objects, but also allows to trace the process of examination and evaluate the results obtained during the examination of the expert's conclusion. Each stage of expert examination of animal carcasses performs certain functions and provides solutions to intermediate tasks.

The division of the process of forensic veterinary examination into separate stages is due to various techniques, as well as tasks that the specialist solves in the process of diagnostic research. The commonality of stages reflects the general points characteristic of any expert research as one of the varieties of cognition forms. The difference lies in the part and volume of the same-named

stages in the structure of diagnostic research.

The application's sequence of stages of the expert research in forensic veterinary examination of animal carcasses allows logically correct analysis of pathomorphological signs found in the animal carcass, and on the basis of their comprehensive assessment to formulate forensic veterinary diagnosis and final conclusions based on expert research.

Given that the procedures of forensic veterinary examination, being in the process of formation, require clear regulation and systematization of stages of forensic veterinary examination (in particular, animal carcasses), we have developed methods for describing and assessing the body and organs of the animal carcass, drawing up an opinion of the forensic veterinary expert based on the results of forensic veterinary autopsy, the procedure for removing objects of forensic veterinary examination from the carcass of an animal and their further laboratory examination, the rules of forensic veterinary examination of animal carcasses. In addition, we have prepared for publication a textbook *"Forensic Veterinary Thanatology: The doctrine of dying, death and cadaveric phenomena"*, which combines various expert cases and reflects the essence and structure of a particular stage of forensic veterinary examination.

Scientific and theoretical developments we test and implement in practice during the forensic veterinary examination of animal carcasses at the National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute», the number of which is growing rapidly every year.

38 Щербаковський М. Г. Зазнач. твір.

39 Listos P., Gryzinska M., Kowalczyk M. Op. cit.

Стадії експертного дослідження та їх застосування у судово-ветеринарній експертизі трупів тварин

Іван Яценко

Обґрунтовано, що стадійність експертного дослідження під час судово-ветеринарної експертизи трупів тварин ґрунтується на загальних методичних положеннях судової експертології і містить принаймні чотири стадії: підготовчу (попереднє дослідження), аналітичну (роздільне дослідження), порівняльну та синтезуючу (оцінну), не лише відбиваючи процедуру пізнання експертом властивостей об'єктів судово-ветеринарної експертизи, а й даючи змогу простежити процес проведення експертизи й оцінити здобуті результати під час оцінювання висновку експерта.

Кожна стадія експертного дослідження трупів тварин обумовлена різними технічними прийомами й завданнями дослідження та забезпечує розв'язання проміжних завдань, які здебільшого мають діагностичний характер. Спільність стадій відображає загальні моменти, характерні для будь-якого експертного дослідження як одного з різновидів форм пізнання. Різниця полягає в частці й обсязі однойменних стадій у структурі діагностичних досліджень. Черговість застосування згаданих стадій сприяє логічно правильному аналізуванню виявлених патоморфологічних ознак і (на підставі всебічного їх оцінювання) формулюванню судово-ветеринарного діагнозу та складанню остаточного висновку експерта.

Розроблено порядок вилучення об'єктів із трупа тварини і подальшого їх лабораторного дослідження, правила судово-ветеринарної експертизи трупів тварин, методичні рекомендації з описування й оцінювання стану ділянок тіла й органів трупа тварини, укладання висновку судово-ветеринарного експерта.

Ключові слова: судово-ветеринарна експертиза; трупи тварин; стадії експертного дослідження; процес і завдання діагностичного дослідження; висновок експерта; методики опису й оцінювання стану ділянок тіла та органів трупа тварини.

Стадии экспертного исследования и их применение в судебно-ветеринарной экспертизе трупов животных **Иван Яценко**

Обосновано, что стадийность экспертного исследования в ходе судебно-ветеринарной экспертизы трупов животных базируется на общих методических положениях судебной экспертизы и включает четыре стадии: подготовительную (предварительное исследование), аналитическую (раздельное исследование), сравнительную и синтезирующую (оценочную), не только отражая процедуру познания экспертом свойств объектов судебно-ветеринарной экспертизы, но и позволяя проследить процесс проведения экспертизы и оценить полученные результаты при оценивании заключения эксперта.

Каждая стадия экспертного исследования трупов животных обусловлена разными техническими приёмами и задачами диагностического исследования и обеспечивает решение промежуточных заданий, имеющих, в основном, диагностический характер. Общность стадий отражает общие моменты, присущие любому экспертному исследованию как одной из разновидностей форм познания. Разница заключается в доле и объёме однойменных стадий в структуре диагностических исследований. Очередность применения упомянутых стадий способствует логически правильному анализируванню обнаруженных патоморфологических признаков

и (на основе всестороннего их оценивания) формулированию судебно-ветеринарного диагноза и составлению окончательного заключения эксперта.

Разработаны порядок изъятия объектов из трупа животного и последующего их лабораторного исследования, правила судебно-ветеринарной экспертизы трупов животных, методические рекомендации по описанию и оцениванию состояния участков тела и органов трупа животного, по составлению заключения судебно-ветеринарного эксперта.

Ключевые слова: судебно-ветеринарная экспертиза; трупы животных; стадии экспертного исследования; процесс и задачи диагностического исследования; заключение эксперта; методики описания и оценивания состояния участков тела и органов трупа животного.

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Declaration of Competing Interest

The author declare that he have no conflict of interest.

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