modified Langsdorf chamber, being at continuous sensitivity, may present some advantages over the Wilson chamber which becomes sensitive only by expansion.

The instrument I have used, which was built at the Institute of Experimental Physics of the University of Milan (Milan Section of the National Institute of Nuclear Physics[1]), works at atmospheric pressure.

It consists of a double-glass-walled container with circular section, 35 cm inside diameter, 18 cm height, closed by a metallic bottom and by a 'roof'. The bottom is cooled down to – 45°C about by a Freon 22 single-phase compressor, having a power of 2 kW; the 'roof' presents a circular opening (20 cm diameter), closed by a crystal through which the events can easily be observed, photographed or filmed.

Some frame electrodes are set in the chamber, in order to produce a clarifying field, the intensity of which may be varied from 20 to 100 V/cm. There are also some annular trays containing liquid ethyl alcohol which is evaporated by armoured resistance.

Alcohol vapor diffuses in the whole chamber and falls downwards owing to gravity and is found in zones of progressively lower temperature.

The fall velocity is such that in a certain stratum, near the bottom, the vapor remains at the aeriform state, while it should be at the liquid state, according to the conditions of pressure and temperature (supersaturated vapor). In such conditions, the vapor is in unstable equilibrium and condenses on any nucleus of condensation.

In the supersaturation zone, the condensation first occurs on the atmospheric dust—the phenomenon lasts a short time (about 5 min)—and afterwards on the ions which happen to be present in the zone. If an ionizing particle passes into this zone, the ions it produces act as nuclei of condensation along its whole trajectory, giving rise to a trace formed by small drops of alcohol well visible to the naked eye.

The observation of the traces requires transverse lighting of the zone by means of an incandescent lamp, while for photography the field is lighted up with linear flashes.

Both flashes and release of the photographic shutter are synchronized by an automatic device. It is also possible to obtain stereoscopic photography of the images.

For determining the energy of the particles, the chamber contains a couple of Helmholtz coils, that are able to generate a magnetic field with a maximal intensity of about 1000 Gauss.

The substrata to be observed are set on special supports, refrigerated with liquid CO_2 and then let directly into the chamber; a few minutes are sufficient to reestablish the inner equilibrium of the instrument and, consequently, the best conditions for observation.

In order to set up the new method, I made several observations of letting into the chamber various substrata: bioptical drawings of animal and vegetal tissues, anatomic particles, vegetal seeds, young small plants, drops of liquids and mineral fragments, taking precautions not to contamine the chamber.

Among the most significant data obtained as yet, I wish to note that we found the presence of Thorium in the inner organs of a man who died owing to a hepatic sarcoma, 20 years after he had been inoculated with Thorotrast.

[1] A. LOVATI and C. SUCCI, Il Nuovo Cimento *11*, 163 (1954).

The absorption of Uranium salts on the part of *Cicer arietinum* and *Faseolus vulgaris* young small plants, experimentally treated in the laboratory, was equally evident.

The method derived from the employment of the modified Langsdorf chamber may, in my opinion, prove very useful for research on ionizing radiations, both to obtain a new orientation and as a complement of the other radiobiological techniques.

Another work in press describes the instrument with full details and also the technique I have set up and the first data I have obtained.

I wish to thank the staff of the Institute of Experimental Physics (Milan University), which put the instrument at my disposal, and particularly Dr. C. GIORI[2], who kindly helped me in this research work.

A. PASINETTI and C. GIORI

Institute of Anatomy and Pathological Histology of the University of Milan (Italy), and Institute of Experimental Physics of the University of Milan (Italy), May 29, 1957.

Riassunto

L'autore descrive un nuovo metodo per l'osservazione di substrati biologici radioattivati, basato sull'impiego della camera a diffusione.

Questo strumento presenta notevoli vantaggi su quelli sinora impiegati in radiobiologia, perchè permette di osservare ad occhio nudo, fotografare ed identificare le caratteristiche di qualsiasi tipo di particelle ionizzanti, indipendentemente dalla loro energia.

La camera a diffusione è particolarmente indicata per lo studio delle radiazioni ionizzanti di bassa energia.

I risultati ottenuti dall'autore durante le osservazioni su organi animali e vegetali, su liquidi e minerali, sono stati assai soddisfacenti.

[2] National Institute of Nuclear Physics, Milan.

A Method for the Incorporation of Radioactive Isotopes in the Sea Urchin Egg

The usual method of incorporating radioactive isotopes in sea urchin eggs or embryos consists in incubating them in sea-water containing the isotope (among others LINDBERG[1]; HULTIN and WESSEL[2]; HULTIN[3]; TYLER and MONROY[4]). The chief disadvantages of this procedure are: (a) the aging of the unfertilized eggs during the 3 to 5 h of incubation necessary to obtain a measurable uptake; (b) the possibility that the uptake may vary in the different stages of development because of differences in permeability to the given labelled compound.

We have now worked out a method which seems to circumvent these difficulties and we wish to describe it briefly.

The experiments have been carried out with S^{35}-DL-methionine (purchased from the Radiochemical Centre, Amersham, England) in DL-methionine carrier at the

[1] O. LINDBERG, Exper. Cell Res. *1*, 105 (1950).
[2] T. HULTIN and G. WESSEL, Exper. Cell Res. *3*, 613 (1952).
[3] T. HULTIN, Ark. f. Kemi *6*, 195 (1953).
[4] A. TYLER and A. MONROY, Biol. Bull. *111*, 296 (1956).

concentration of 100 μc/100 μM of methionine/ml. 10 to 20 μc of this solution are injected into the body cavity of adult females of *Paracentrotus lividus* which are then left at room temperature in a moist chamber for 4 h.

The animals are cut open and the eggs collected by shaking the ovaries in sea-water. The eggs are then filtered through bolting silk and washed three times with sea-water. For chemical work, the jelly-coat was removed by treatment with acid sea-water. It proved to be free of radioactivity even after being concentrated by ethanol precipitation.

In the total homogenate of jelly-free unfertilized eggs specific activities of the order of 400 counts/min/mg total N have been obtained. No measurable loss of isotope has been found to occur during early development.

As is the case in the vertebrates, when isotopes are injected intraperitoneally, it may be assumed that also in this case the incorporation in the eggs is operated by the metabolism of the animal.

One of the advantages of this method seems therefore to be the avoidance of the long incubation of the eggs or embryos in sea-water containing the isotope. Furthermore it affords the possibility of following continuously the change in the distribution of the isotope among cell components starting from the base-line of the unfertilized egg. Investigations along these lines are in progress in this laboratory.

The present investigation has been supported by a Grant from Consiglio Nazionale delle Ricerche. The expenses for providing the measuring equipment have been defrayed by the Banco di Sicilia and the Cassa di Risparmio.

E. NAKANO* and A. MONROY

Laboratory of Comparative Anatomy, The University of Palermo (Italy), June 22, 1957.

Riassunto

Con la iniezione di 10–20 μc di Metionina-S^{35} nella cavità celomatica di femmine adulte di *Paracentrotus lividus* si ottiene una rapida ed efficiente incorporazione dell'isotopo nelle uova. Si discutono i vantaggi del metodo rispetto a quello attualmente in uso.

* Aided by a Grant from the Rockefeller Foundation, on leave from the Nagoya University, Japan.

Informations - Informationen - Informazioni - Notes

Bericht über die 4. Tagung für Elektronenmikroskopie des Schweizer Komitees für Optik

INSTITUT FÜR ALLGEMEINE BOTANIK DER EIDG. TECHNISCHEN HOCHSCHULE

23. Mai 1957

Die diesjährige Tagung wurde durch Herrn Prof. Dr. A. FREY-WYSSLING eröffnet, der als Hauptreferenten Herrn Prof. Dr. V. E. COSSLETT begrüssen durfte. In seinem kurzen Überblick über die gegenwärtige Situation der Elektronenmikroskopie in der Schweiz erwähnte FREY-WYSSLING, dass es gerade zehn Jahre her sind, seit die ersten Bilder über den Feinbau von Gelen mit dem Elektronenmikroskop der Firma Trüb, Täuber & Co. erhalten wurden. An Hand von einigen Lichtbildern über die submikroskopische Struktur von pflanzlichen Zellwänden und Chloroplasten wurde der gewaltige Fortschritt aufgezeigt, den die stürmische Entwicklung der Elektronenmikroskopie in den letzten zehn Jahren erlaubt hat. Es wurde darauf hingewiesen, dass für eine rationelle Arbeit zwei Typen von Elektronenmikroskopen benötigt werden, einerseits solche von mittlerem Auflösungsvermögen für Routineuntersuchungen und zur Überwachung der Präparationsarbeiten, und anderseits Hochleistungsmikroskope, über die die Schweiz zur Zeit noch kaum verfügt, die es ermöglichen, ins Gebiet der makromolekularen Dimensionen vorzustossen. Um dieses Ziel zu erreichen, muss allerdings die Präparationstechnik für die meisten Objekte noch wesentlich verbessert und verfeinert werden.

Nach dieser Einführung ergriff Herr Prof. Dr. V. E. COSSLETT das Wort, um über neue Ergebnisse seines eigenen und der übrigen Laboratorien in Cambridge zu berichten. Er verstand es vorzüglich, die verschiedenen Anwendungsmöglichkeiten dieses Gerätes in der Biologie, Medizin und Metallographie aufzuzeigen und an Hand zahlreicher instruktiver Bilder zu illustrieren.

Als zweites Referat der Vormittagssitzung folgte ein Vortrag von Herrn Dr. E. B. BAŞ über

Elektronenstrahler für Elektronenmikroskopie und Elektronenbeugung

Ausgehend von der heute erreichbaren maximalen Ausbeute des Fluoreszenzschirmes, für 100-kV-Elektronen ca. 5×10^5 asb/w.cm^2, und von der zu fordernden Minimalleuchtdichte des Fluoreszenzschirmes für eine sichere Scharfstellung sehr kontrastarmer Objekte von ca. 1 asb, lässt sich die minimale, im Endbild des Elektronenmikroskopes zu realisierende Stromdichte zu ca. 2×10^{-11} A/cm^2 ausrechnen. Multipliziert man diesen Wert mit der Endvergrösserung des Mikroskopes, so erhält man die im Objekt durch den Elektronenstrahler bereitzustellende Objektstromdichte; bei einem Hochleistungsmikroskop mit 200000facher Vergrösserung ca. 0,8/cm^2. Betrachtungen über die räumliche Kohärenz der Beleuchtungsstrahlen führen auf eine wünschenswerte Beleuchtungsapertur von ca. 10^{-4}, während praktisch in den meisten Fällen dieselbe bei 10^{-3} liegt und im äussersten Falle gleich der optimalen Objektivapertur von ca. 10^{-2} sein darf. Damit werden vom Elektronenstrahler folgende Richtstrahlwerte gefordert: bei hochkohärenter Bestrahlung ca. $2{,}5 \times 10^7$ A/cm^2, im praktischen Betrieb ca. $2{,}5 \times 10^5$ A/cm^2. Die Theorie zeigt, dass mit einer Emissionsstromdichte der Kathode von 3 A/cm^2 als *theoretischer Grenzwert* ein Maximal-Richtstrahlwert bei 100 kV von ca. 4×10^5 A/cm^2 zu erwarten ist. Vergleichende Zusammenstellung der an praktischen Elektronenstrahlern gemessenen Richtstrahlwerte zeigt, dass man in der Praxis in den meisten Fällen von dem theoretischen Optimum noch sehr weit entfernt ist. Eine Möglichkeit für die Realisierung sehr hoher Richtstrahlwerte besteht in der Anwendung der Thermo-Feld-Emission. Ein sehr bedeutender Punkt für die Anwendung hoher Richtstrahlwerte in der Elektronenmikroskopie ist die chromatische Kohärenz der Beleuchtungsstrahlen, welche nach den Messungen von BOERSCH so verschlechtert werden